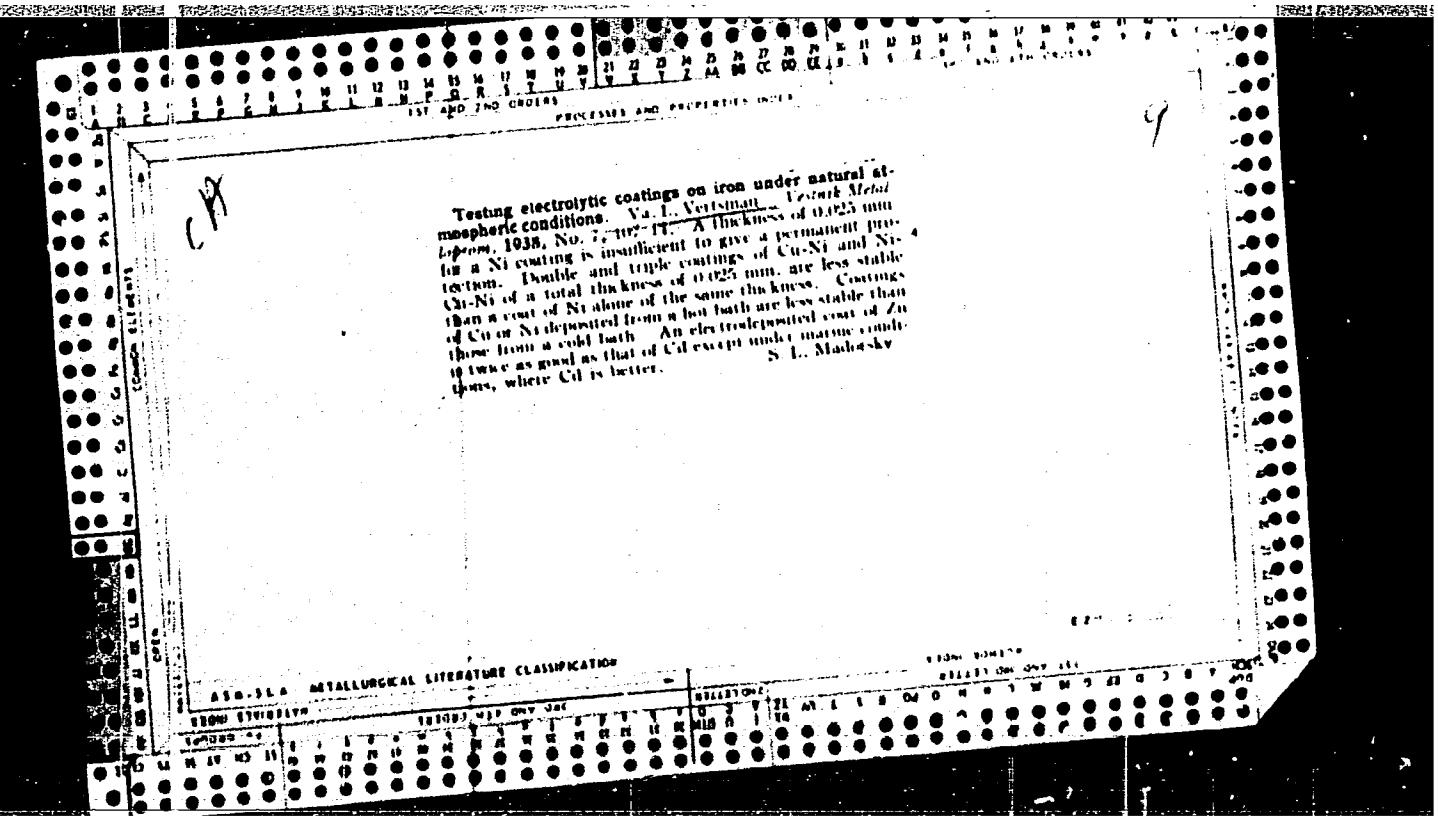
GEYKO, N.F., inzh., red.; KOZLOVSKIY, B.K., inzh., red.; VERTSMAN, G.Z., kand. tekhn. nauk, red.; VLASOV, D.I., inzh., red.; DUZINKEVICH, S.Yu., inzh., red.; MADERA, G.I., red.

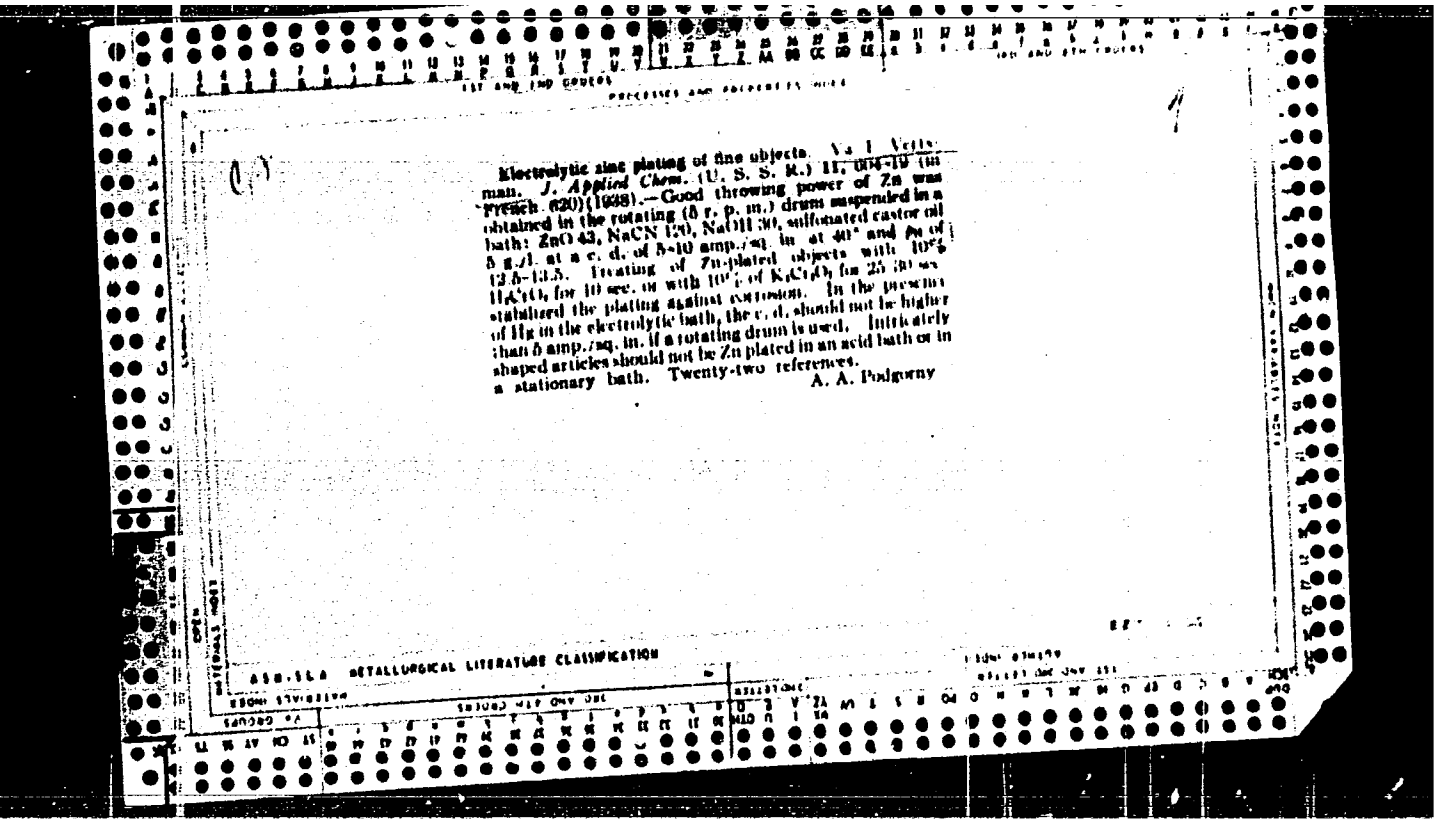
[Construction specifications and regulations] Stroitel'nye normy i pravila. Moskva, Stroiizdat. Pt.2. Sec.A. ch.3. 1964. 16 p. Pt.2. Sec. D. ch.1. 1964. 62 p.
(MIRA 18:2)

1. Russia (1923- U.S.S.R.) Gosudarstvennyy komitet po delam stroitel'stva. 2. Gosstroy SSSR (for Geyko, Kozlovskiy, Duzinkevich). 3. Vsesoyuznyy nauchno-issledovatel'skiy institut transportnogo stroitel'stva (for Vertsman). 4. Gosudarstvennyy institut tekhniko-ekonomicheskikh izyskaniy i proyektirovaniya zheleznodorozhnogo transporta (for Vlasov). 5. TSentral'nyy nauchno-issledovatel'skiy i proyektno-eksperimental'nyy institut industrial'nykh, zhilykh i massovykh kul'turno-bytovykh zdaniy Akademii stroitel'stva i arkhitektury SSSR (for Madera).



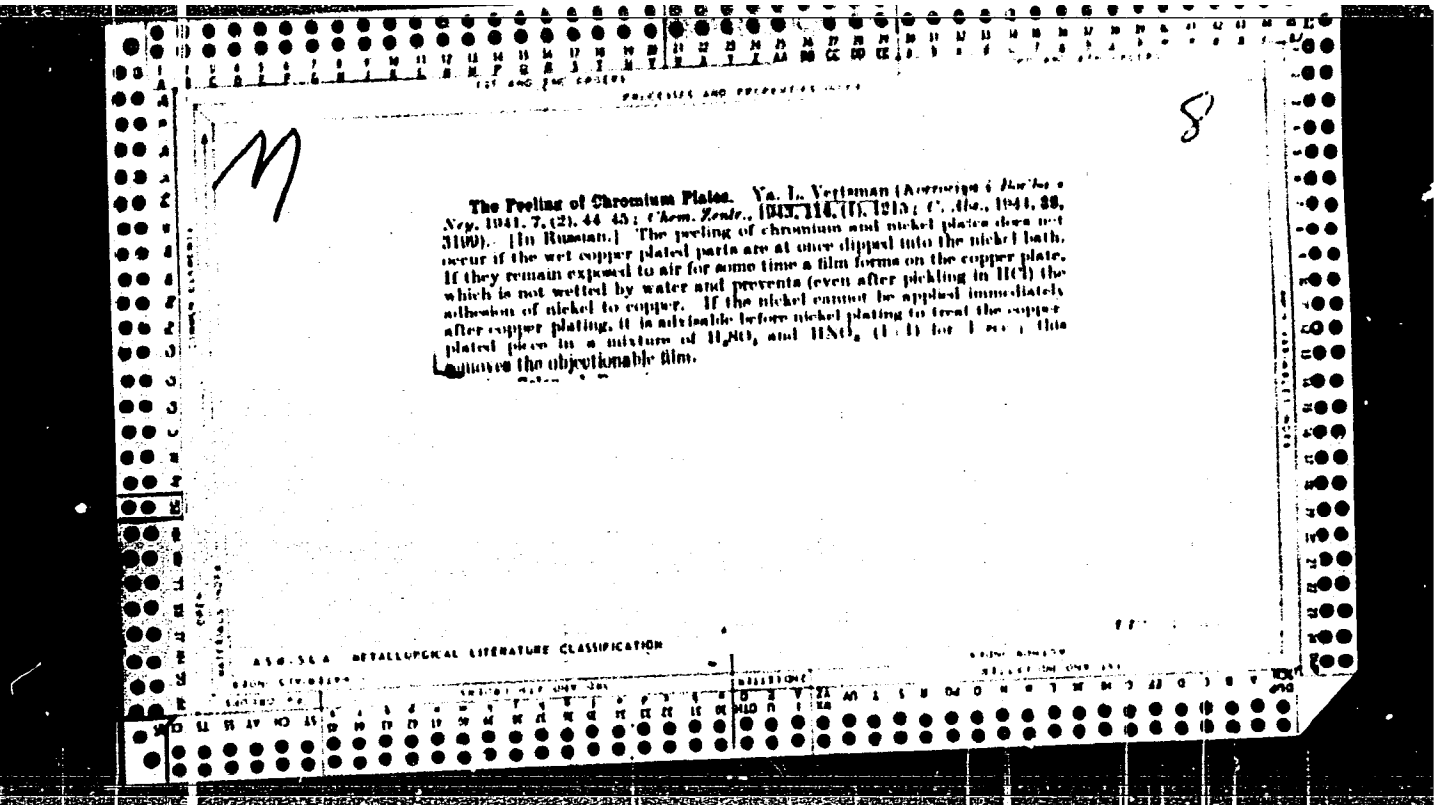
Testing electrolytic coatings on iron under natural atmospheric conditions. Va. I. Vetsman. *Vestnik Metallopromy.*, 1938, No. 7, 107–17. A thickness of 0.025 mm. for a Ni coating is insufficient to give a permanent protection. Double and triple coatings of Cu-Ni and Ni-Cu-Ni of a total thickness of 0.025 mm. are less stable than a coat of Ni alone of the same thickness. Coatings of Cu or Ni deposited from a hot bath are less stable than those from a cold bath. An electrodeposited coat of Zn is twice as good as that of Cd except under marine conditions, where Cd is better. S. L. Madorsky

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



Electrolytic zinc plating of fine objects. Va. I. Veits-man. *J. Applied Chem.* (U. S. S. R.) 11, 614-19 (in Russian, 620) (1938).—Good throwing power of Zn was obtained in the rotating (5 r. p. m.) drum suspended in a bath: ZnO 43, NaCN 120, NaOH 30, sulfonated castor oil 5 g./l. at a c. d. of 5-10 amp./sq. in. at 40° and pH of 12.5-13.5. Treating of Zn-plated objects with 10^{-6} H_2CrO_4 for 10 sec. or with 10^{-4} of K_2CrO_4 for 25-30 sec. stabilized the plating against corrosion. In the presence of Hg in the electrolytic bath, the c. d. should not be higher than 5 amp./sq. in. If a rotating drum is used, intricately shaped articles should not be Zn plated in an acid bath or in a stationary bath. Twenty-two references.

A. A. Podgorny



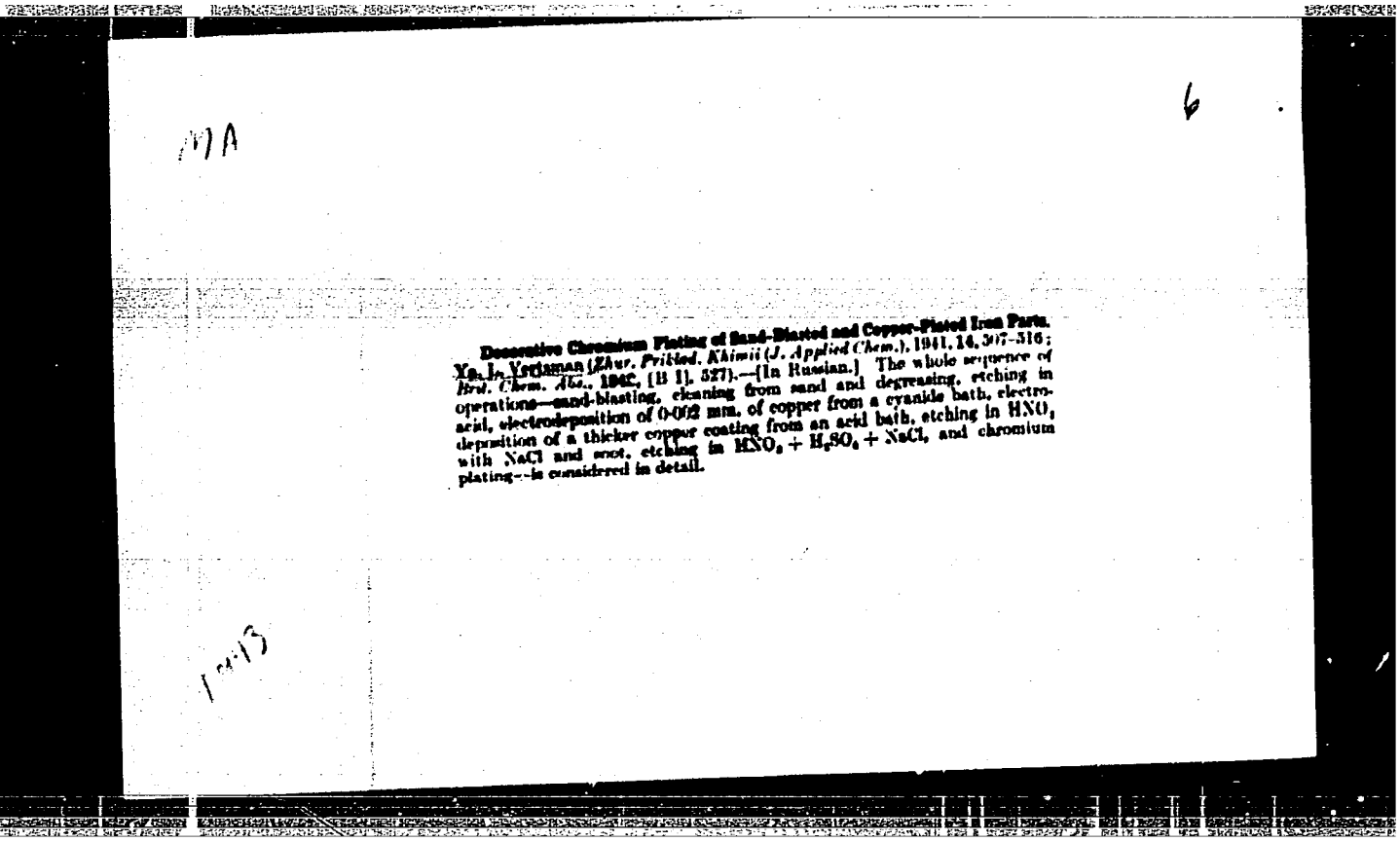
The Peeling of Chromium Plates. Ya. I. Vettsman (Аттестация [illegible]. Nov. 1941, 7, (2), 44–45; *Chem. Zentr.*, 1943, 114, (I), 1215; *C. Abs.*, 1944, 38, 3100). [In Russian.] The peeling of chromium and nickel plates does not occur if the wet copper plated parts are at once dipped into the nickel bath. If they remain exposed to air for some time a film forms on the copper plate, which is not wetted by water and prevents (even after pickling in HCl) the adhesion of nickel to copper. If the nickel cannot be applied immediately after copper plating, it is advisable before nickel plating to treat the copper plated piece in a mixture of H_2SO_4 and HNO_3 (1 : 1) for 1 min.; this removes the objectionable film.

M. a -

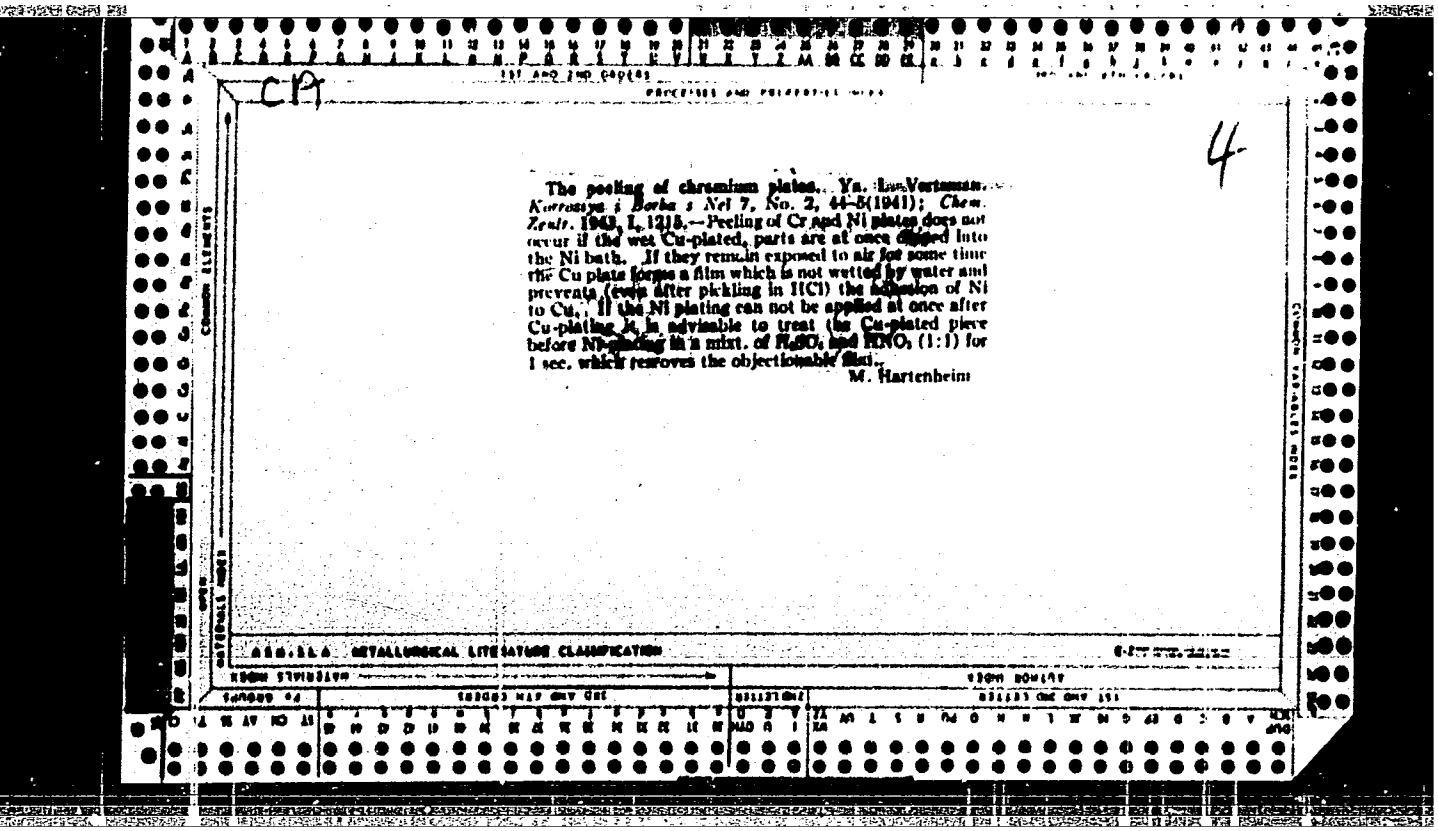
E Corrosion related phenomena

The Testing of Electrodeposited Coatings on Iron in Natural Atmospheres Conditions. Ya. I. Yerlsman (*Trans. Metalloprom. (Met. Ind. Herald)*, 1934, 18, 171. 107-114).—(In Russian.) Specimens of iron, protected by electrodeposited coatings of cadmium, zinc, nickel, nickel + copper + nickel, chromium + nickel, and tin, were exposed for just under two years to an industrial atmosphere. From [illegible] ...ical examination of the specimens, it was concluded that: (1) the usually recommended thickness of nickel coating (0·025 mm.) does not guarantee prolonged protection under severe conditions; (2) multilayer coatings of nickel + copper or nickel + copper + nickel b) a total thickness of 0·025 mm. are not superior to a single nickel coat of that thickness; (3) copper and nickel deposits from rapid baths are less porous than those from cold electrolytes; (4) in severe conditions tin affords better protection than cadmium; (5) zinc provides twice the corrosion resistance of cadmium, except in marine conditions, where cadmium is preferred; (6) the method of surface preparation before cadmium or zinc plating has a great effect on the resistance of the coatings; (7) no important difference was noted [illegible] corrosion-resistance between zinc coatings deposited from cyanide [illegible] and those from acid solutions.—N. B. V.

1913



Decorative Chromium Plating of Sand-Blasted and Copper-Plated Iron Parts.
Ya. I. Yerlaman (*Zhur. Prikład. Khimii* (*J. Applied Chem.*), 1941, 14, 307–316; *Brit. Chem. Abs.*, 1942, [B 1], 527).—[In Russian.] The whole sequence of operations—sand-blasting, cleaning from sand and degreasing, etching in acid, electrodeposition of 0·002 mm. of copper from a cyanide bath, electrodeposition of a thicker copper coating from an acid bath, etching in HNO_3 with NaCl and soot, etching in $HNO_3 + H_2SO_4 + NaCl$, and chromium plating—is considered in detail.

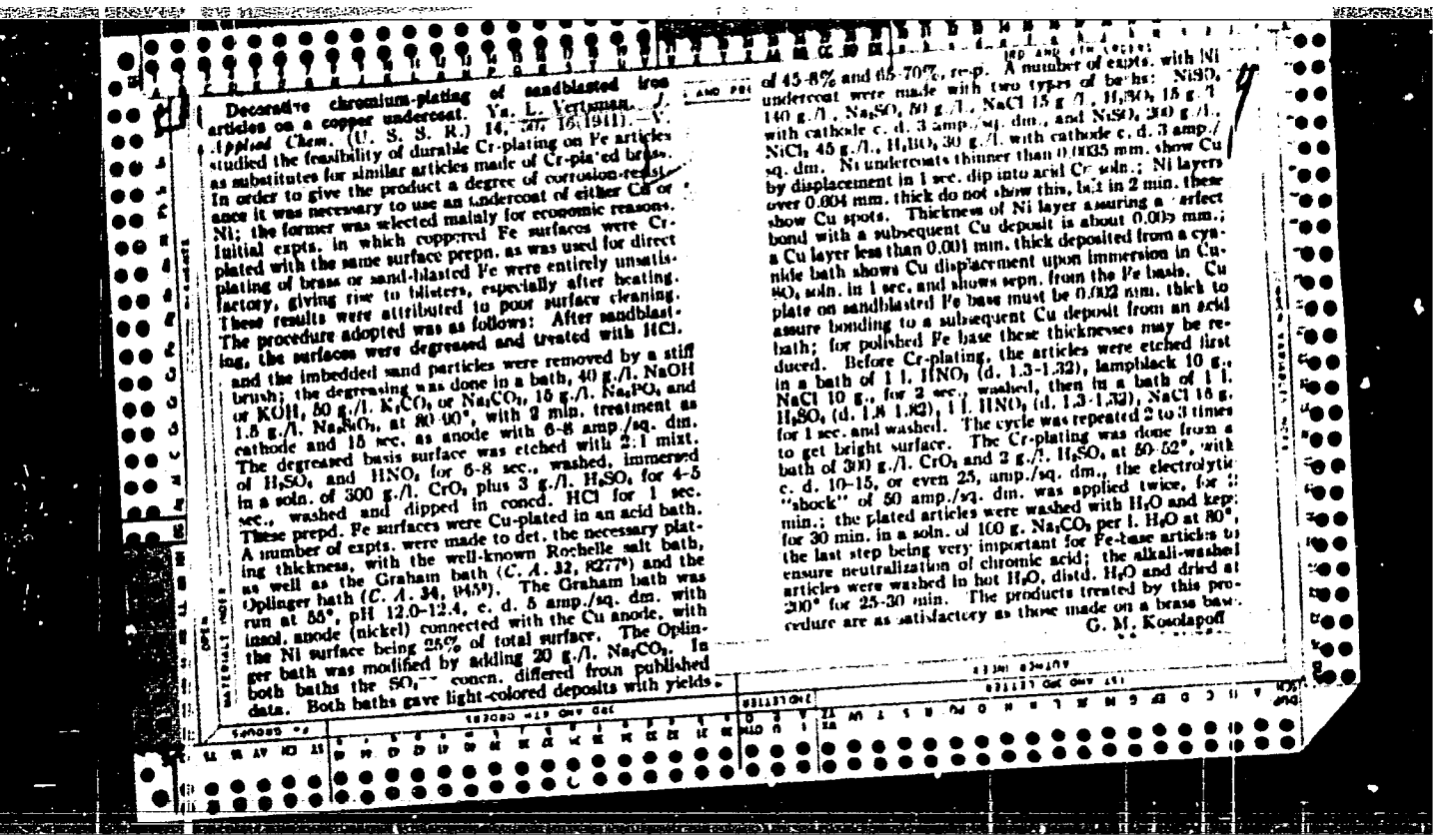


CP

4

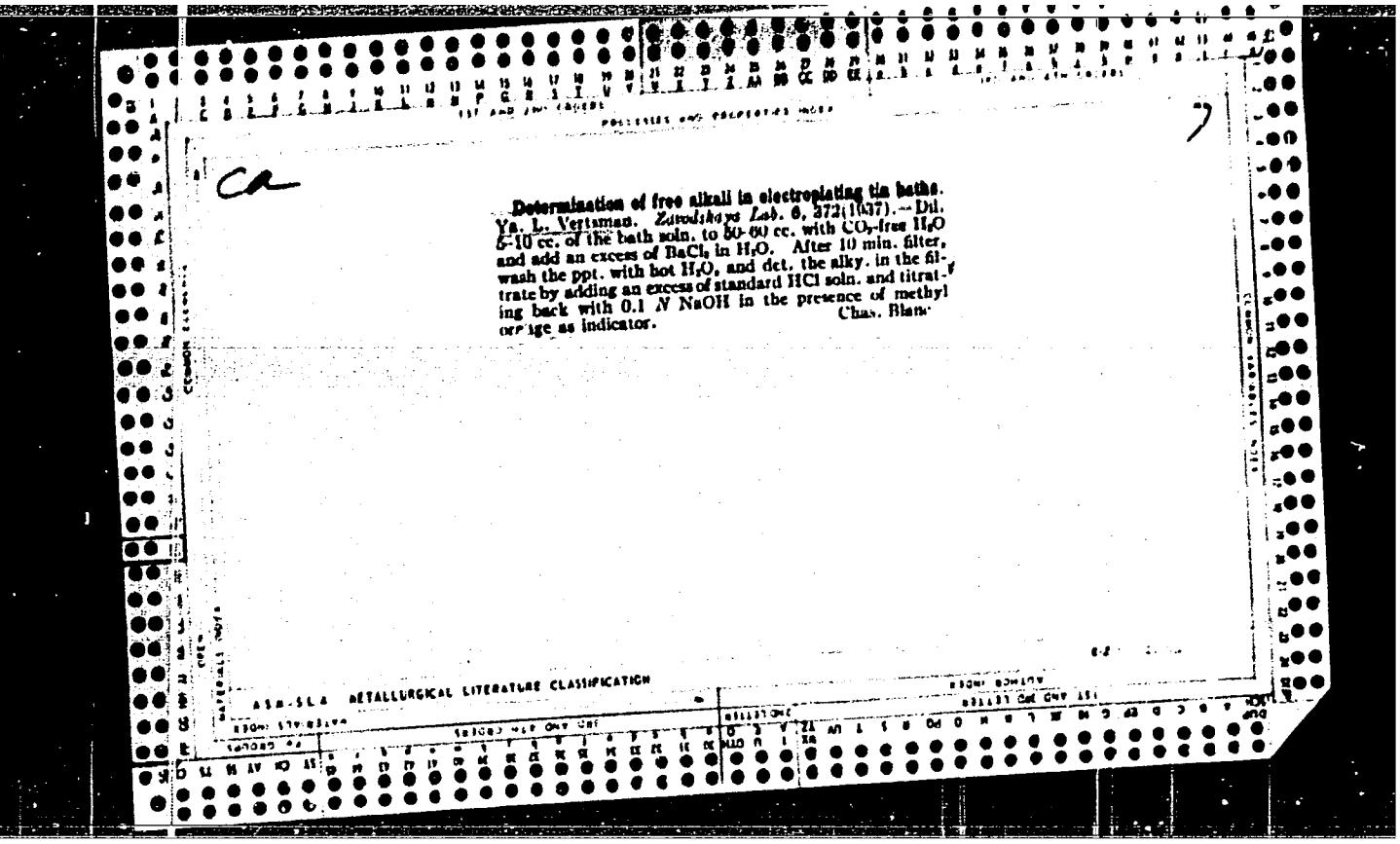
The peeling of chromium plates. Ya. Lu. Vertsman. *Korroziya i Borba s Net* 7, No. 2, 44–8(1941); *Chem. Zentr.* 1943, I, 1218.—Peeling of Cr and Ni plates does not occur if the wet Cu-plated parts are at once dipped into the Ni bath. If they remain exposed to air for some time the Cu plate forms a film which is not wetted by water and prevents (even after pickling in HCl) the adhesion of Ni to Cu. If the Ni plating can not be applied at once after Cu-plating it is advisable to treat the Cu-plated piece before Ni-plating in a mixt. of H_2SO_4 and HNO_3 (1:1) for 1 sec. which removes the objectionable film.

M. Hartenheim



Decorative chromium-plating of sandblasted iron articles on a copper undercoat. Ya. L. Yerlyman. *J. Applied Chem.* (U. S. S. R.) 14, 247–76 (1941).—V. studied the feasibility of durable Cr-plating on Fe articles as substitutes for similar articles made of Cr-plated brass. In order to give the product a degree of corrosion-resistance it was necessary to use an undercoat of either Cu or Ni; the former was selected mainly for economic reasons. Initial expts. in which coppered Fe surfaces were Cr-plated with the same surface prepn. as was used for direct plating of brass or sand-blasted Fe were entirely unsatisfactory, giving rise to blisters, especially after heating. These results were attributed to poor surface cleaning. The procedure adopted was as follows: After sandblasting, the surfaces were degreased and treated with HCl, and the imbedded sand particles were removed by a stiff brush; the degreasing was done in a bath, 40 g./l. NaOH or KOH, 50 g./l. K_2CO_3 or Na_2CO_3, 15 g./l. Na_3PO_4 and 1.5 g./l. Na_2SiO_3, at 80–90°, with 2 min. treatment as cathode and 15 sec. as anode with 6–8 amp./sq. dm. The degreased basis surface was etched with 2:1 mixt. of H_2SO_4 and HNO_3 for 6–8 sec., washed, immersed in a soln. of 300 g./l. CrO_3 plus 3 g./l. H_2SO_4 for 4–5 sec., washed and dipped in concd. HCl for 1 sec. These prepd. Fe surfaces were Cu-plated in an acid bath. A number of expts. were made to det. the necessary plating thickness, with the well-known Rochelle salt bath, as well as the Graham bath (*C. A.* 32, 8277°) and the Oplinger bath (*C. A.* 34, 9459). The Graham bath was run at 55°, pH 12.0–12.4, c. d. 5 amp./sq. dm. with insol. anode (nickel) connected with the Cu anode, with the Ni surface being 25% of total surface. The Oplinger bath was modified by adding 20 g./l. Na_2CO_3. In both baths the SO_4^{--} concn. differed from published data. Both baths gave light-colored deposits with yields of 45–8% and 65–70%, resp. A number of expts. with Ni undercoat were made with two types of baths: $NiSO_4$ 140 g./l., Na_2SO_4 80 g./l., NaCl 15 g./l., H_3BO_3 15 g./l. with cathode c. d. 3 amp./sq. dm., and $NiSO_4$ 240 g./l., $NiCl_2$ 45 g./l., H_3BO_3 30 g./l. with cathode c. d. 3 amp./sq. dm. Ni undercoats thinner than 0.0035 mm. show Cu by displacement in 1 sec. dip into acid Cr soln.; Ni layers over 0.004 mm. thick do not show this, but in 2 min. these show Cu spots. Thickness of Ni layer assuring a perfect bond with a subsequent Cu deposit is about 0.005 mm.; a Cu layer less than 0.001 mm. thick deposited from a cyanide bath shows Cu displacement upon immersion in Cu-SO_4 soln. in 1 sec. and shows sepn. from the Fe basis. Cu plate on sandblasted Fe base must be 0.002 mm. thick to assure bonding to a subsequent Cu deposit from an acid bath; for polished Fe base these thicknesses may be reduced. Before Cr-plating, the articles were etched first in a bath of 1 l. HNO_3 (d. 1.3–1.32), lampblack 10 g., NaCl 10 g., for 2 sec., washed, then in a bath of 1 l. H_2SO_4 (d. 1.8–1.82), 1 l. HNO_3 (d. 1.3–1.32), NaCl 15 g. for 1 sec. and washed. The cycle was repeated 2 to 3 times to get bright surface. The Cr-plating was done from a bath of 300 g./l. CrO_3 and 3 g./l. H_2SO_4 at 50–52°, with c. d. 10–15, or even 25, amp./sq. dm., the electrolytic "shock" of 50 amp./sq. dm. was applied twice, for 3 min.; the plated articles were washed with H_2O and kept for 30 min. in a soln. of 100 g. Na_2CO_3 per l. H_2O at 80°, the last step being very important for Fe-base articles to ensure neutralization of chromic acid; the alkali-washed articles were washed in hot H_2O, distd. H_2O and dried at 200° for 25–30 min. The products treated by this procedure are as satisfactory as those made on a brass base.

G. M. Kosolapoff



Ca

7

Determination of free alkali in electroplating tin baths. Ya. L. Vertsman. *Zavodskaya Lab.* 6, 372(1937).—Dil. 5–10 cc. of the bath soln. to 50–60 cc. with CO_2-free H_2O and add an excess of $BaCl_2$ in H_2O. After 10 min. filter, wash the ppt. with hot H_2O, and det. the alky. in the filtrate by adding an excess of standard HCl soln. and titrating back with 0.1 *N* NaOH in the presence of methyl orange as indicator. Chas. Blanc

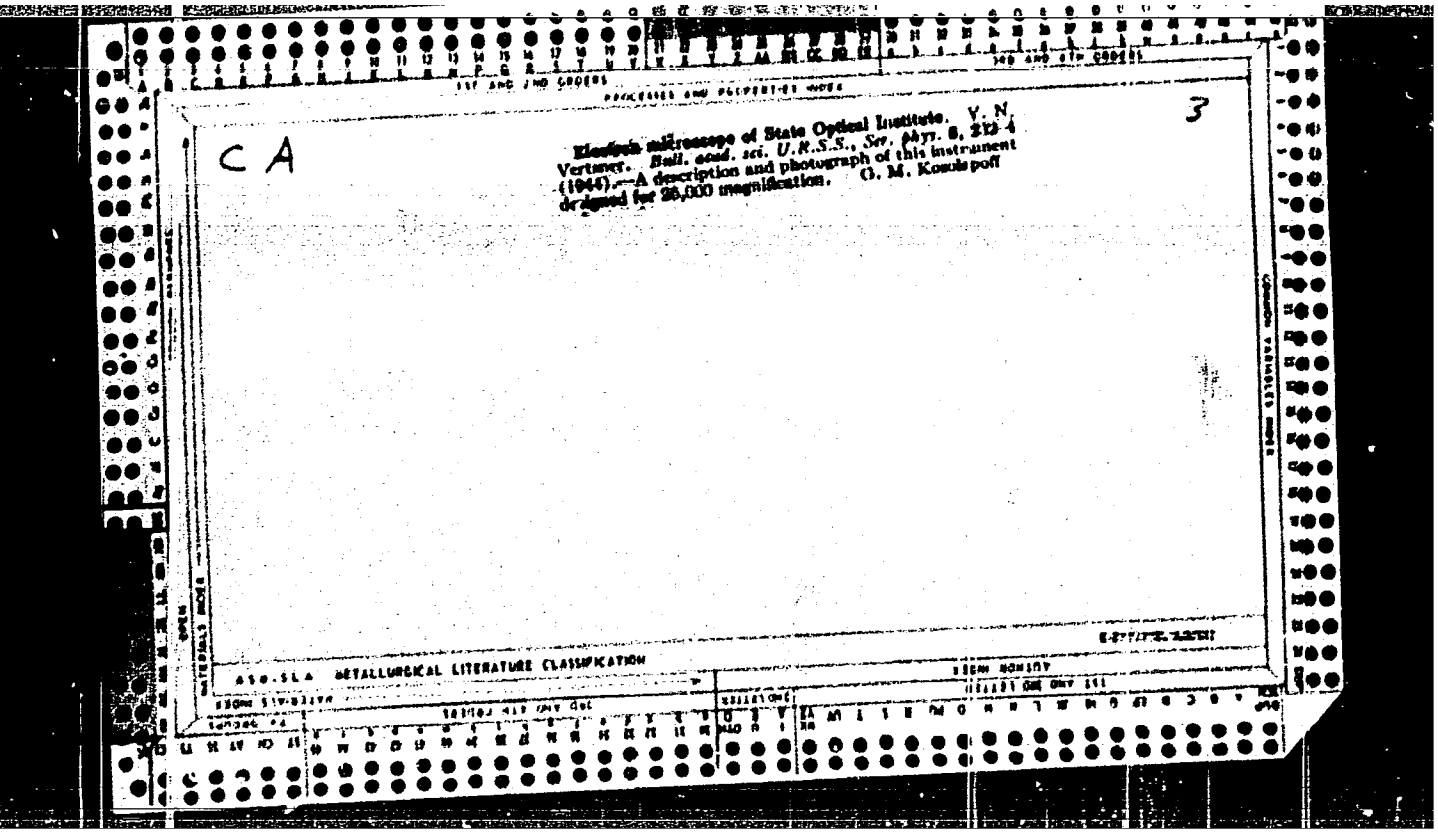
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

VERTSNER, V.H.; KISLYAK, I.S.

Hemorrhagic crises following chicken pox. Pediatriia no.8:91-93 '62. (MIRA 15:10)

1. Iz Detskoy klinicheskoy bol'nitsy No. 1 i kafedry fakul'tetskoy pediatrii II Moskovskogo gosudarstvennogo meditsinskogo instituta imeni N.I.Pirogova.

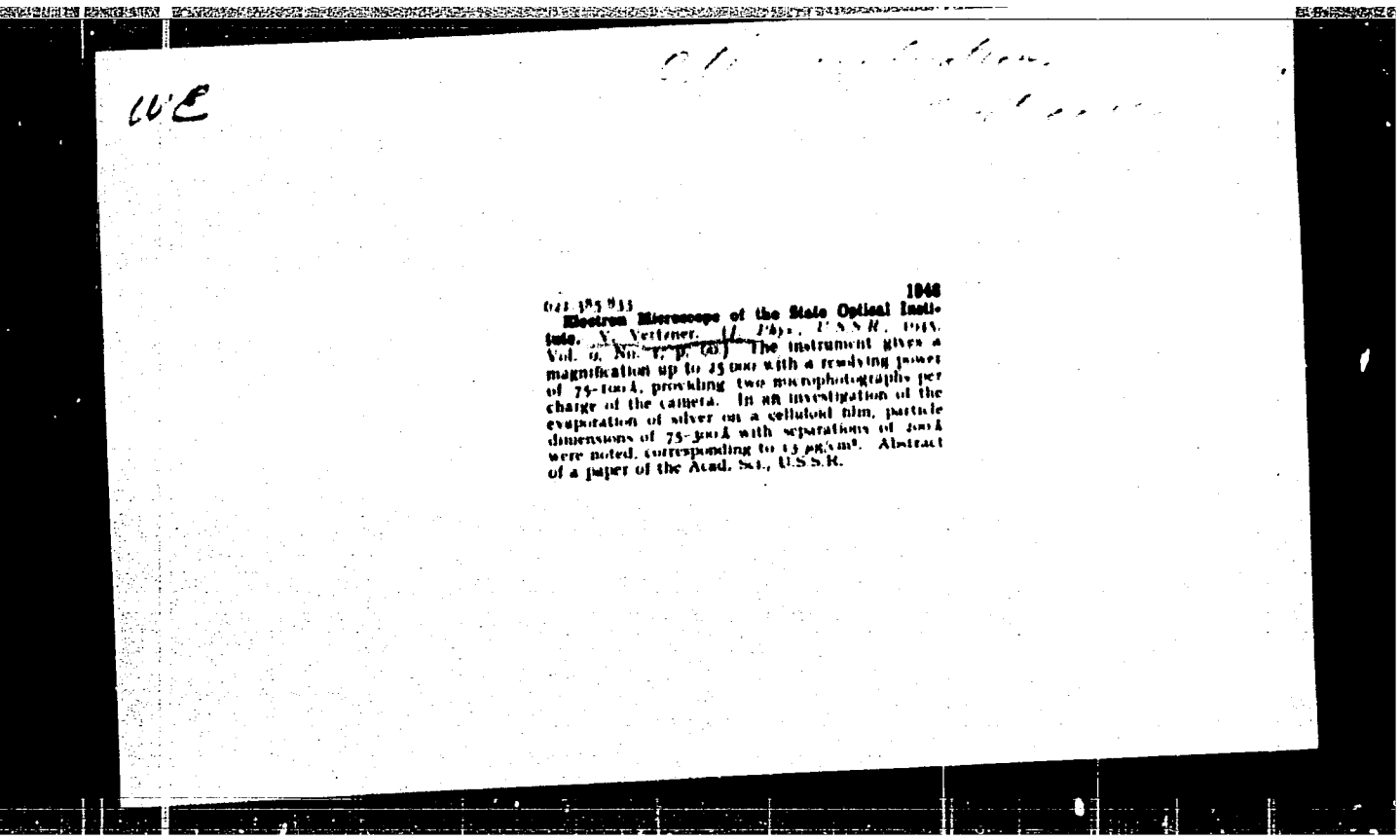
(CHICKEN POX)
(HEMORRHAGE)



VERTNER, V. N.

"Some Structural Details of Diatom Pelurosigma Elongatum as Revealed with the Aid of Electron Microscope," Dok. AN, 44, No 3, 1944.

State Optical Inst.

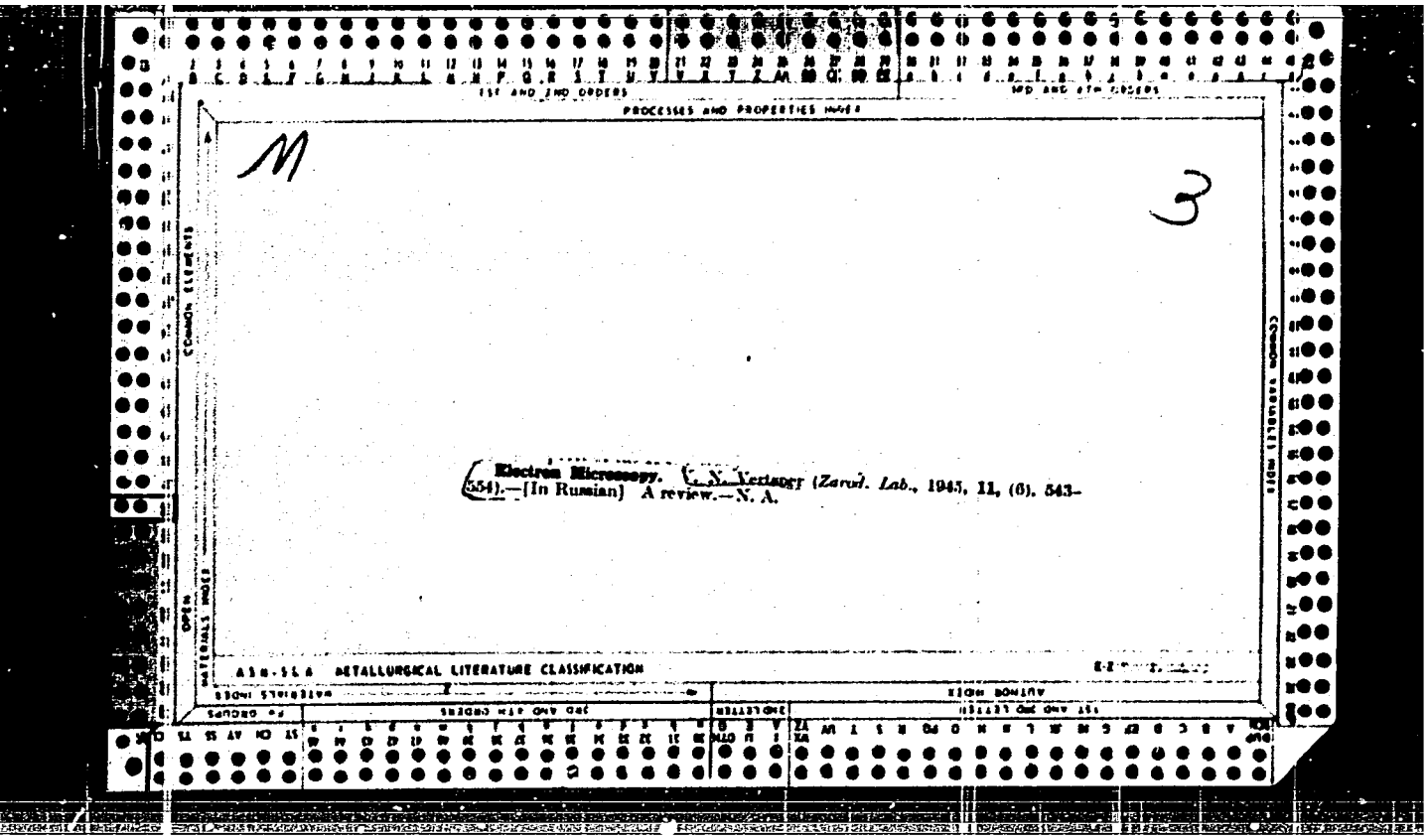


W'E

1948

621.385.833

Electron Microscope of the State Optical Institute. V. Vertiner. *Zh. Tekh. Fiz., USSR*, 1948, Vol. 9, No. 7, p. (0) The instrument gives a magnification up to 45 000 with a resolving power of 75-100 Å, providing two microphotographs per charge of the camera. In an investigation of the evaporation of silver on a celluloid film, particle dimensions of 75-300 Å with separations of 300 Å were noted, corresponding to 13 $\mu g/cm^2$. Abstract of a paper of the Acad. Sci., U.S.S.R.



Electron Microscopy. V. N. Verzhbit (*Zavod. Lab.*, 1945, 11, (6), 543–554).—[In Russian] A review.—N. A.

PERTSEV, L.P., inzh.; KHODORETS, A.N., inzh.; VERUGA, V.F., inzh.

Using a hydrodynamic clutch in the drives of machinery for the chemical industry. Khim.mashinostr. no.1:33-34 Ja-F '64. (MIRA 17:4)

VERTSNER, V. N. PA 36T102

USSR/Physics Nov 1947
Microscopes, Electron
Medicine - Microscopy

"Soviet Electron Microscopes," V. N. Vertsner, State Optical Institute, 10½ pp

"Zavodskaya Laboratoriya" Vol XIII, No 11

Describes the principle of the electron microscope, discusses the various parts such as the electron gun, the condenser lens, stand for the microscope and chamber for the specimens, objective lens, projection lens, photochamber of the microscope, the vacuum system of the microscope, the electric circuits for an electron microscope. The description of the microscope appears

LC 36T102

USSR/Physics (Contd) Nov 1947

to be a description of either the Siemens or RCA Type B or EMU microscopes but frequent comparison is made with microscopes produced by the State Optical Institute of the USSR.

LC 36T102

VERTSNER, V. N.

PA 58T87

USSR/Physics
Microscope, Electron
Optics, Electronic

Aug 1947

"Electron Gun of an Electron Microscope," V. N. Vertsner, State Optical Inst, 3 pp

"Dok Akad Nauk SSSR, Nova Ser" Vol LVII, No 5

Contains detailed description of electron gun of GOI electron microscope; discusses advantages of not using large quantities of high-voltage current, and includes graphs indicating brilliancy under various conditions. Submitted by Academician A. A. Lebedev, 11 Mar 1947.

58T87

Mb[illegible], State Optical Institute -1947-

"Electron-Microscopic Investigation of the Structure of the Valve Staurocneis Phoenicentron Ehr.," Dok. AN, 57, No, 8, 1947

USSR/Chemistry - Kaolinite
Chemistry - Crystalline Structure Sep 1947

"The Crystalline Structure of Kaolinite," V. N. Vertsner, G. O. Bagdyr'yants, Z. G. Pinsker, State Optical Inst, and Inst Geochem and Analytic Chem imeni Acad V. I. Vernadskiy, Acad Sci USSR, 3½ pp

"Dok Akad Nauk SSSR, Nova Ser" Vol LVII, No 9

Describes results obtained in electronographic studies of kaolinite. Electrographs made by means of electron microscope produced by State Optical Institute. Advantage of electronographic method is permits obtaining of data supplementary to data obtained by means of electron-microscope. Authors express gratitude to Academician A. A. Lebedev. Submitted by letter, 11 Mar 1947.

53T19

FA 36T103

VERTSNER, V. N.

USSR/Physics Nov 1947
Microscope, Electronic
Medicine - Microscopy

"Simple Method for Shadow Covers in Electron Microscopes," V. N. Vertsner, State Optical Institute, 3 pp

"Dok Ak Nauk" Vol LVIII, No 6 - mp 1031-3

Recently in electron microscopy a method using metallic filters which in many instances produced a greater increase in contrast has been adopted, and increases the efficiency of electron microscopes. Author discusses the principle on which these filters operate and cites some of the more common uses for this attachment. Submitted by A. A. Lebedev 9 Jun 1947.

36T103

VERISNER, B. N.

The electron microscope and its use,a verbatim report of a public lecture Moskva Pravda 1948. 23 p. (49-1583)

QH211.V4

VERTSNER, V. N.

USSR/Medicine-Tissue, Section Nov/Dec 48
Medicine-Electron Microscopy

"Electron Microscopic Examination of Histological Phenomena," V. N. Vertsner, L. S. Gol'din, State Opt Inst, Dept of Morph, Brain Inst imeni Bekhterev, 18 pp

"Zhur Obshch Biol" Vol IX, No 6

Conducted experiments to determine to what extent it would be possible to use the electron microscope for examining nerve tissues and other histological phenomena. Made studies of tissues obtained from the brain, spinal column, peripheral nerves, and other organs of the body. Studied structure of

49/49T83

USSR/Medicine-Tissue, Section (Contd) Nov/Dec 48

Nerve fibers magnified 20,000 - 50,000 times, and determined objects which were no larger than 30 - 40 angstrom units. Several photographs show features of tissues studied.

49/49T83

Vertsner, V. N.

Category: USSR/Fitting Out of Laboratories. Instruments, Their Theory, H. Construction and Use.

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 31135

Author : Vertsner V. N.
Inst : not given
Title : Electron Microscopy and New Methods of Studying Microstructures

Orig Pub: Sb. Vopr. mikroskopii. M.-L., Mashgiz, 1956, 117-155

Abstract: A review. Bibliography 38 references.

Card : 1/1 -7-

VERTSNER, V.N.

AUTHORS: Vertsner, V.N., Kel'ner, N.A. and Solov'yev, A.M.

TITLE: The Formation of Oxides in Lead Sulphide Films and Photoresistances. (Obrazovaniye okislov v sernistosvintsovykh sloyakh i fotosoprotivleniyakh).

PERIODICAL: Kristallografiya, 1957, Vol.2, Nr 4, pp.497-502 (USSR)

ABSTRACT: Electronographic investigations of PbS sublimates, obtained in the form of thin unsupported films and as layers of about 1 μ thickness on glass, showed that when in thin layers PbS transforms at 340° to a stable oxide, which has the lanarkite lattice, but which differs from it in composition. At 450° and above PbS goes to another stable oxide $4PbO.PbSO_4$. The rate of oxidation depends on the temperature and on the type of sublimate. The formation of an oriented layer of lanarkite, the crystals of which on subsequent heating lose their orientation precedes the formation on the surface of a film of PbO_2 and $PbO.PbSO_4$. The appearance of sub-layers, richer in PbO, proceeds after the formation of the layer which usually occurs in the surface structure of sensitive photoresistances. The differences observed in the course of oxidation of the free films and the sublimates of PbS on glass are most probably conditioned by the differences in the thickness and structure of the layers and the

Card 1/2

70-4-8/16

The Formation of Oxides in Lead Sulphide Films and Photoresistances.

existence of different conditions for the interaction of the PbS with the atmospheric oxygen. Tables of the observed powder pattern spacings are given together with reproductions of the patterns. Acknowledgements are made to Acad. A. A. Lebedev. There are 2 tables, 1 figure, 5 plates and 19 references, 7 of which are Slavic.

SUBMITTED: March 19, 1957.
AVAILABLE: Library of Congress.

Card 2/2

WERTSNER, V. N.

51-2-11/15

AUTHORS: Vertsner, V.N., Degteva, L.V. and Kharionovskiy, Yu.S.

TITLE: A method of observation of the diffraction-grating profile using electron microscope. (Sposob nablyudeniya profilya diffraktsionnykh reshetok v elektronnom mikroskope)

PERIODICAL: "Optika i Spektroskopiya" (Optics and Spectroscopy) 1957, Vol.3, No.2, pp.181-183 (U.S.S.R.)

ABSTRACT: Both glass and aluminium diffraction gratings were studied. For glass gratings a thin silver replica was prepared by vacuum deposition; this was strengthened by an electrodeposited copper layer 0.01-0.02 mm thick. The grating and the replica were separated in distilled water. For aluminium gratings double-replica technique was used. First a naproduoh (parlodion) replica was prepared, using a 5% solution in amyl acetate. From this a silver-copper replica, as described above, was made and parlodion dissolved off in amyl acetate. The replicas were bent at right angles to the diffraction grooves and the profile photographed using an electron microscope. The results are shown in Fig.1 (glass diffraction-grating profile, 50 lines/mm, magnif. X 4000) and Fig.2a (aluminium grating profile, 1200 lines/mm, magnif. not stated). Fig.2b shows superposition of the profile of Fig.2a onto a microphotograph of the replica. This profile study is useful in investigation of the effect of groove-cutter shape and load. It can be also used to study polished surfaces:

Card 1/2

51-2-11/15

A method of observation of the diffraction-grating profile using electron microscope. (Cont.)

steel profile is shown in Fig.3 (X 9600). The authors thank Academician A.A.Lebedev for the interest he took in the work, F.M.Gerasimov for the samples and advice, and A.I.Kuznetsov for help in carrying out the experiments. There are three figures and three references, all Slavic.

SUBMITTED: March 4, 1957.
AVAILABLE: Library of Congress

Card 2/2

Vertsner, V. N.

51-6-16/25

AUTHORS: Vertsner, V. N., and Malakhov, L. N.

TITLE: Application of an Electron-Optical Method to the Study of Micro-Distribution of Electric Fields. (Primeneniye elektronnoopticheskogo metoda k izucheniyu mikroraspredeleniya elektricheskikh poley.)

PERIODICAL: Optika i Spektroskopiya, 1957, Vol. III, Nr. 6, pp. 649-652. (USSR)

ABSTRACT: The present paper described methods for study of micro-distribution of potential on semiconductors by means of shadow electromicrographs. This method was first proposed in 1949 (Ref.1). It was applied by Vavilov (Ref.2) to the study of drift of photo-current carriers in lead sulphide photo-resistances. It is possible to observe local electrical or magnetic fields in a sample because electrons which form the image of the sample interact with such fields and their trajectories are altered. The principle of the method is shown in Fig.1. A parallel beam of electrons

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Application of an Electron-Optical Method to the Study of Micro-Distribution of Electric Fields.

is incident on a lens L and, in the absence of perturbing electrical or magnetic fields on the object S', produces a shadow image of an obstruction ED placed beyond the focus of the lens L. A thin wire may serve as an obstruction ED. If there is a voltage across the sample S', then the electron beam is deflected, i.e. a displacement of the shadow image of ED is observed on the screen. The magnitude of this displacement is a measure of the perturbing field on S'. Actually, instead of a wire a metal grid (screen) was used. The microscope had long-focus objectives and electrons of comparatively low velocities were used. Two variants of the method were used: (1) a coordinate grid was used as an indicator of the magnitude of the field, and (2) displacement of the image of the object itself due to the presence of the field was employed. Resolution for 50 kV electrons was 0.1 μ. The electron source was only 1-2 μ in height, which made it possible to use magnifications of 200-300. Under

Application of an Electron-Optical Method to the Study of Micro-Distribution of Electric Fields.

such conditions fields of the order of 0.2-0.3 V could be detected. Fig.2 shows the displacement of the coordinate grid image in the region of a p-n junction of a In-Ge sample with 18 V applied in the blocking direction (magnification 2000). Fig.2 shows that the coordinate grid displacements are greatest in the region of the junction itself. The junction was found to be about 17 μ wide (Fig.3). Similar studies of Cu_2O rectifiers showed that their p-n junction is only 2.5-3 μ wide (Fig.3) when 6.7 V are applied to it. Magnitude of distribution of electric fields on the surfaces of polycrystalline semiconductors was studied by measuring displacement of the shadow image of the semiconductor itself. A resolution of 0.2 μ was obtained, and minimum measurable potential was 0.2 V. The apparatus used is shown in Fig.4. A point source O produces a shadow image of the object AS. If a voltage is

Application of an Electron-Optical Method to the Study of Micro-Distribution of Electric Fields.

applied to the object, then electrons which form the image of the object edge are deflected. A lens L_3 magnifies the image. Fig.5 shows a layer of lead sulphide deposited on a glass prism with a sharp edge. One of the ends of the sample was grounded and a voltage was applied at the other end of the sample. A grounded wire was placed parallel to the edge of the sample so that between each point on the sample edge and wire there was a potential difference which decreased gradually towards the grounded end of the PbS sample. Fig.5 shows that the displacement between the two shadow images of the sample edge gradually decreases following a potential distribution along the sample. The electron-optical method of study of electric fields described in this paper gives the potential distribution on the semiconductor surface only. For PbS it is not permissible to take surface conditions as representing conditions in the bulk of the sample. The authors thank Academician A. A. Lebedev for suggesting the subject and for

51-6-16/25

Application of an Electron-Optical Method to the Study of Micro-Distribution of Electric Fields.

valuable advice. There are 5 figures and 3 references, of which 2 are Russian and 1 English.

SUBMITTED: April 1, 1957.

AVAILABLE: Library of Congress.

Card 5/5

Vertsner, V.N.

BERLAGA, R.Ya., kand.fiz.-mat.nauk; VERTSNER, V.N., kand.fiz.-mat.nauk; LEBEDEV, A.A., akademik.

Electron microscopy in the Soviet Union. Zav.lab. 23 no.10:1214-1219 '57. (MIRA 10:12)

(Electron microscopy)

VERTSNER, V. N.

56-5-2/55

AUTHOR VERTSNER, V.N., GORBUNOV B.V., OKSMAN, Ya.A.

TITLE Structural Peculiarities of Sb_2S_3 -layers (Strukturnyye osobennosti sernistoy surmy. Russian)

PERIODICAL Zhurn. Eksperim. i Teoret. Fiziki, 1957, Vol 32, Nr 5, pp 957 - 961 (U.S.S.R.)

ABSTRACT The structural investigations of a thin, photo-sensitive antimony-sulphur layer by the "electrographic" method showed that this layer consists mainly of amorphous Sb_2S_3, a thin oxide skin of cubic Sb_2S_3-crystals, and perhaps also of some metallic antimony.

Heating of the sublimates causes growing of the crystals. The crystallites forming on the surface during the oxide phase have a different orientation which depends on the temperature of the base upon which they were precipitated.

The phenomenon of photosensitivity of the Sb_2S_3-layer is probably not bound to the crystallization of the principal quantity of the antimony, but due to the processes responsible for the oxide phase.

ASSOCIATION State Optical Institute

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VERTSNER, V.N.

KRICHEVSKIY, Yevgeniy Samoylovich; FEDOROVICH, Leonid Grigor'yevich; FELICOV, Vladimir Fedorovich; VERTSNER, V.N., kand. fiz.-mat. nauk, retsenzent; KRUGER, M.Ya., inzh., retsenzent; SHOSHIN, I.A., inzh., retsenzent; SOBOLEV, S.F., inzh., retsenzent; DULIN, V.N., kand. tekhn. nauk, red.; BOGOMOLOVA, M.F., red. izd-va; PUKHLIKOVA, N.A., tekhn. red.

[Electrical equipment in optical and mechanical instruments] Elektrooborudovanie optiko-mekhanicheskikh priborov. Moskva, Gos. izd-vo obor. promyshl., 1958. 467 p. (MIRA 11:7)
(Electronic apparatus and appliances)
(Electric apparatus and appliances)

SOV/51-5-1-14/19

AUTHORS: Vertsner, V.N. and Solov'yev, A.M.

TITLE: Use of the EM-3 Electron Microscope for X-Ray Spectral Microanalysis (Ispol'zovaniye elektronnogo mikroskopa EM-3 dlya provedeniya rentgenospektral'nogo mikroanaliza)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 1, pp 83-85 (USSR)

ABSTRACT: In 1954 the authors started to work on the possibility of using the EM-3 electron microscope for local X-ray spectral analysis. The apparatus developed consists of three main parts: an electron-optical system, an X-ray spectrograph and a recording system. The electron-optical system uses the EM-3 electron microscope (Fig 3). This system is in the form of a vertical column, consisting of an electron gun, and condensing, projecting and objective lenses. The sample is attached to the stage of the EM-3 microscope which may be moved by means of an electric motor when a particular place on the sample has to be studied. The X-rays excited by the electron beam of the EM-3 microscope leave through a window with low X-ray absorption. The X-ray emission is analysed by means of a bent-crystal spectrograph (Fig 2). The X-ray spectrum is recorded using a Geiger-Müller counter with subsequent amplification. Pulses from the counter are integrated and are fed to a self-recording electronic voltmeter. The diameter of

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Use of the EM-3 Electron Microscope for X-Ray Spectral Microanalysis

the X-ray source at the electron beam focus (which was less than 1 μ in size) was about 1-2 μ in diameter. The resolving power of the spectrograph in that region of the spectrum where the Cu K_α- doublet occurs was found to be 0.6 X-units. Using the apparatus described chemical composition of separate phases of 2-phase cobalt alloys with Cr, W, Ni and other elements were obtained (Fig 4). The authors thank A.A. Lebedev for advice. There are 4 figures and 7 references, 2 of which are American, 3 Soviet, 1 international and 1 English.

ASSOCIATION: Gosudarstvennyy opticheskiy institut im. S.I. Vavilova (State Optical Institute imeni S.I. Vavilov)

SUBMITTED: August 1, 1957

Card 2/2 1. Electron microscopes - Applications 2. X-ray spectrum analyzers - Applications 3. Geiger counters - Applications

Vertsner, V. N.

20-2-16/60

AUTHORS: Vertsner, V. N., Malakhov, L. N.

TITLE: The Use of Electron Microscope Shadow Method for Studying the Potential Distribution in p-n-Transitions (Primeneniye tenevoy elektronno-mikroskopicheskoy metodiki k izucheniyu raspredeleniya potentsiala v p-n- perekhodakh)

PERIODICAL: Doklady AN SSSR, 1958, Vol. 118, Nr 2, pp. 266 - 268 (USSR)

ABSTRACT: The striae-method (svilevaya metodika) can be transferred to electron optics, if there are local electric and magnetic inhomogeneities. For this reason micro-inhomogeneities in the distribution of electric or magnetic fields can be found by the striae-method. To ascertain quantitative data about the distribution of such fields, the electron optical shadow method has been worked out, its principle is illustrated by a figure. This electron-optical methods first was used only for semiconductors. The present work uses this method for observation of the zone of decrease of the potential in p-n-transitions of germanium. The electron optical device was realized by using a

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The Use of Electron Microscope Shadow Method for Studying the Potential Distribution in p-n-Transitions

"net of coordinates" as indicator for the electric field. The use of an accelerating voltage of 50 000 V made it possible to observe the objects in test with a suffident resolution of $\sim 0{,}1\ \mu$. The sensitivity for electric fields is guaranteed by the clear definition of the shadow image of the "net of coordinates". In spite of having used fast electrons, a potential of 0,3 V was found. To increase the accuracy of differences in the shift of the grid-system, the authors used the method of the "differential exposures". In this occasion on the same photographic plate the shadow images of the distorted and of the undistorted net-system were taken. This method increased the accuracy of the differences and shortened the time of exposure. Here p-n-transitions were examined in the case of germanium monocrystals. A typical image of a p-n-transition which has been got by means of the method, described here, will be added. The authors hope to be able to study the physical processes in the case of the rupture in p-n-transitions more exactly by this method. There are 3 figures, and 4 references, 3 of which are Slavic.

VERTSNER, V.N.

24(4) PHASE I BOOK EXPLOITATION SOV/3140

Fotoelektricheskiye yavleniya v poluprovodnikakh; trudy pervogo Vsesoyuznogo soveshchaniya po fotoelektricheskim i opticheskim yavleniyam v poluprovodnikakh, 6- 11 iyun', 20-26 noyabrya 1957 g. (Photoelectric and Optical Phenomena in Semiconductors; Transactions of the First Conference on Photoelectric and Optical Phenomena in Semiconductors...) Kiyev, 1959. 403 p. 4,000 copies printed.

Additional Sponsoring Agency: Akademiya nauk SSSR. Prezidium.

Komissiya po poluprovodnikam.

Ed. of Publishing House: I. V. Kisina; Tech. Ed.: A. A. Matveychuk; Resp. Ed.: V. Ye. Lashkarev, Academician, Ukrainian SSR, Academy of Sciences.

PURPOSE: This book is intended for scientists in the field of semiconductor physics, solid state spectroscopy, and semiconductor devices. The collection will be useful to advanced students in universities and institutes of higher technical training specializing in the physics and technical application of semiconductors.

COVERAGE: The collection contains reports and information bulletins (the latter are indicated by asterisks) read at the First All-Union Conference on Optical and Photoelectric Phenomena in Semiconductors. A wide scope of problems in semiconductor physics and technology are considered: photoconductivity, cells and photoresistors, optical properties, photoelectric cells and photoresistors, the actions of hard and corpuscular radiations, motive forces, the actions of hard and corpuscular systems, the properties of thin films and complex semiconductor systems, etc. The materials were prepared for publication by E. I. Adirovich, K. B. Tolpygo, A. F. Lubchenko, and M. K. Sheinkman. References and discussion follow each article.

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Kolesnikova, E. T., and B. V. Paylov. Displacement of the Absorption Band in Vitreous Semiconductors of the System As2Se3-As2Te3 207

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Vertsner, V. N., and Yu. A. Chaman. Investigation of the Composition of Thin Layers of the Photosensitive Sb2S3 Layers

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9(0)

AUTHOR: Vertsner, V.N.

SOV/48-23-4-1/21

TITLE: Fundamental Tendencies in the Modern Electron Microscope Construction (Osnovnyye tendentsii v sovremennom elektronnomikroskopostroyenii). Microscopes for Investigation With Penetrating Electron Beams (Mikroskopy dlya issledovaniya v prokhodyashchikh elektronnykh luchakh)

PERIODICAL: Izvestiya Akad..mii nauk SSSR, Seriya fizicheskaya, 1959, Vol 23, Nr 4, pp 426 - 435 (USSR)

ABSTRACT: After a rapid development made in the last decade the following types of electron microscopes are now available: 1) microscopes for investigations with penetrating electron beam; 2) microscopes for investigations with reflected beam; 3) shadow microscopes; 4) grating microscopes; 5) microscopes for the investigation of self-illuminating objects (emission microscopes). Mainly microscopes of the first type have so far been produced industrially, but also the production of reflected beam electron microscopes and emission microscopes is now being prepared, and the same applies also for shadow microscopes. The large number of electron microscopes of different efficiency, as constructed by several firms in a number of countries calls for a classification. The following categories

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are suggested: 1st category: instruments with a resolving power of up to 15-10 Å; 2nd category: instruments with a resolving power of up to 30-20 Å; 3rd category: instruments with a resolving power of up to 60-40 Å. Instruments with a resolving power of up to 7-8 Å are not covered here. Table 1 shows 21 electron microscopes of Russian and non-Russian make under this classification, and the Russian models EM-5 (2nd category) and UEMB-100 (1st category), which have been designed for series production, are specially mentioned. The type of focusing in the models HM-3 and HS-6 of the Japanese firm Khitachi, of the German firm Zeiss (Tseyss), of the firm Farrand Optikal' K and of the Swiss firm Trüb-Tauber is discussed. Focusing of the electron beam in the gun in the Japanese TRS-50E1, JEM-T1 and in the German Siemens Elmiskop II is discussed next. Also the hot cathode in the TRS-50E1 is mentioned. Figure 2 shows a simplified scheme of the path of beams in the electron microscopes IEM-T1, EL'MISKOP II and EM-7B (Philips, Holland). Next, the further constructional development and possible improvements of the aforementioned microscopes are discussed and a modification made on the Japanese JEM-5 is described. The prevention

of astigmatism is investigated. The author points out the continuous adjustment of magnification from the range of photo-optical microscopes (500-1000) up to 10000-30000 and in the Philips EM-100B, as well as in EM-5 up to 90000. In the Elmiskop I and in the UEMB-100 (MRTP, USSR) this is made possible up to 160000fold magnification. Almost all microscopes are equipped for operation with penetrating beam, for shadow- and stereoscopical pictures, as, for example, the EMU-3A (Radio Corporation, USA). With the exception of the instruments JEM-T1, EM-75B and Elmiskop II, all of them allow working with microdiffraction, with penetrating and reflected beam. In some instruments the object may be heated up to 1000° or cooled down to -180°, respectively. The figures 4a, 4b, 4v show the microscopes JEM-T1, JEM-T4 and JEM-5 (Japan, Electron Optics Laboratory) in cross section. Next, the author describes increasing difficulties when adjusting at higher magnifications. The requirements placed on the mechanical construction and on the electric system are discussed. Also a microtome is mentioned, which allows the cutting of sections up to a thickness of 50-60 Å. In conclusion, the author mentions the aim of the future development of electron microscopes. There are 4 figures and 2 tables.

AUTHORS: Komissarchik, Ya.Yu., Vertsner, V.N., Gol'din, L.S. SOV/48-23-4-9/21

TITLE: A Simplified Ultramicrotome (Uproshchennyy ultramikrotom)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1959, Vol 23, Nr 4, pp 473 - 477 (USSR)

ABSTRACT: The authors Ardenne, Richard and Shostrand have shown that histological preparations with a thickness exceeding 0.1 μ were not suited for electron microscopic investigations. Later investigations by Liebman and Ornstein showed that in massive preparations with a thickness not exceeding 300 Å, a resolution up to 20 Å could be attained at 50 kv accelerating voltage. At an accelerating voltage of 100 kv and a preparation thickness of 0.1 μ a resolution of up to 20 Å is obtained. The method of using replicas, which are thin transparent films pressed on the surface of metallographic samples and thereupon removed for examination, gives inaccurate results because the fine structure of replicas is demolished on removal. The utilization of hyperfine sections (preparations) of histological objects offers the most favorable investigation conditions and great

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A Simplified Ultramicrotome SOV/48-23-4-9/21

interest is devoted to instruments for the preparation of hyperfine sections. The principle governing this ultramicrotome is described: static knife and object moved with respect to it. Next, the ultramicrotome suggested by Latta and Hartman (Ref 3), featuring a glass knife, is described. By the method suggested by Newman and collaborators, which contemplates utilizing the linear extension of a heated metal rod as a feed for the preparation, Hodge and collaborators attained thicknesses of 10-20 Å. The simplified ultramicrotome developed by the authors consists of the following main parts: the object is fastened at the end of a unilaterally fixed steel shaft, which is worked out as an equal-strength beam (maximum diameter 10 mm, minimum 6 mm, 380 mm long). The free end of the steel shaft is moved upon an ellipse-shaped path by a lever arrangement. A knife is fastened onto a support. The object is then moved by the knife, while the shaft is electrically heated between two cuts. Sitte's method (Ref 5) is mentioned in this connection. The lever arrangement was devised by Chebyshev. A binocular microscope MBS-1 serves for observation. There are 5 figures and 7 references, 2 of which are Soviet.

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Psychoneurological Inst. im V.M. Bekhterev; State Optical Inst im S.I. Vavilov

AUTHORS: Bogdanovskiy, G. A., Kuprevich, V. F., SOV/48-23-4-10/21
Vartanov, V. M., Stepanov, I. V.

TITLE: A Light-electronic High-resolution Microscope With the Utilization of Monocrystalline Image Screens (Svetoelektronnyy mikroskop s ispol'zovaniyem monokristallicheskikh ekranov vysokogo razresheniya)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 4, pp 478-480 (USSR)

ABSTRACT: Image screens with polycrystalline phosphorus are used with electronic microscopes. They do not offer a very high resolution. Monocrystalline image screens offer a much higher resolution and allow a photo-optical investigation of the electron optical magnification. Ardenne (Ref 1) made use of ZnS monocrystals. With artificially prepared ZnS and CdS monocrystals one obtains a resolution of up to 2 μ at an accelerating voltage of 20 kv. Figure 1 shows the scheme of an arrangement for the measurement of light output and resolving power. A net is projected onto the image screen and the lowest magnification is determined, at which the net is still visible. A table gives measuring results of 4 different

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A Light-electronic High-resolution Microscope With the Utilization of Monocrystalline Image Screens

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image screens. The scheme of a photoelectron microscope is shown as an application for monocrystalline image screens. There are 2 stages: the first is a common electron microscope with a monocrystalline image screen and the second stage is a photo-optical microscope for the investigation of the image screen. There are 2 figures depicting a 3500 fold magnification, resolving power amounting up to 150 Å. There are 3 figures, 1 table, and 2 references.

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AUTHORS: Vertsner, V. N., Ivanov, M. G., SOV/48-23-4-12/21
Kozelkin, V. V., Bogdanovskiy, G. A., Vorob'yev, Yu. V.,
Klyukin, V. Ye., Nikiforova, V. A., Chentsov, Yu. V.

TITLE: The Series Electron Microscope EM-5 (Seriynyy elektronnyy mikroskop EM-5)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1959, Vol 23, Nr 4, pp 485 - 489 (USSR)

ABSTRACT: The electron microscope EM-5 is a high-resolution instrument (Fig 1). The principal elements are arranged vertically and the image screen exhibits high resolution. There is a camera, and various adjusting facilities allow good working conditions. In the object, the part hit by the electron beam has a diameter of 7-5 μ.
The object is situated on an object slide, which is movable from outside. The object lens and its stigmator consisting of eight coils are accurately described, as well as the intermediate and projecting lens. The diffraction mount allows electronography with penetrating and reflected beam. The camera works with plate dimensions of 4.5×6 cm and 4.5×3 cm. The instrument features a special vacuum system. Acceleration takes place by the voltage steps 40, 50, and 60 kv. The current source is stabilized, its

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fluctuation amounting to 0.003%. The electrical supplies are discussed. The electron microscope EM-5 allows a bright and dark field illumination, stereoscopic investigations, microdiffraction images, dark field investigations of the diffraction reflexes, etc. On focusing, the image screen is observed through a binocular microscope with a 9fold magnification. The resolving power amounts to 20 Å. There are 3 figures and 3 Soviet references.

AUTHORS: Chentsov, Yu. V., Vertsner, V. N., Bogdanovskiy, G. A. SOV/48-23-4-18/21

TITLE: Some Constructional Improvements of an Electron Microscope EM-3 (Nekotoryye konstruktivnyye uluchsheniya elektronnogo mikroskopa EM-3)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya, 1959, Vol 23, Nr 4, pp 519 - 521 (USSR)

ABSTRACT: The present paper describes the experiments and results, that were conducted in order to improve the quality of the electron microscope EM-3. It was first of all necessary to increase the resolution and the light output. A new electron gun was developed with an almost punctiform cathode. In order to render the centering of the individual microscope parts easier, a stand was designed with an internal micrometer. A special appliance was designed for the adjustment of the illumination system, which makes the adjustment of the object lens and condenser easier. By employing a new material "Permendyur" instead of Armco iron in the pole shoes the quality of the image was improved. Also the astigmatic variation of the focus upon the optical axis was strongly diminished, thus increasing the resolving power to 30 Å. Work with reflected beam was made possible, and electronographic operations may be carried

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Some Constructional Improvements of an Electron Microscope EM-3 SOV/48-23-4-18/21

out by removing the projecting lens. The instrument was equipped with a camera and improvements were also made in the high-voltage system. The chromatic aberration was considerably diminished. A binocular microscope of the type BM-51-2 with 9fold magnification was installed. There are 5 figures and 2 Soviet references.

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AUTHOR: Vertsner, V. N. SOV/48-23-6-2/28

TITLE: Investigation of the Structure of the PbS-sublimates by Means of Methods of Electron Microscopy and Electronography (Issledovaniye struktury PbS-sublimatov metodami elektronnoy mikroskopii i elektronografii)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 6, pp 673 - 675 (USSR)

ABSTRACT: The properties of lead sulfite- photoresistors depend on the structure of the primary sublimates, which are obtained by vacuum evaporation and are a crystalline PbS layer; the latter attains a thickness of the magnitude 1μ. According to their outer shape, three types are distinguished, viz. two with metallic and one with a dark surface. Two papers are mentioned (Refs 1,2), in which it is shown that the crystals are oriented in the layers, and a number of factors is enumerated upon which this orientation depends. Considerable influence is exercised by the base layer. The crystalline structure of the layer depends on temperature and on the crystalline structure of the base layer. Likewise, the vapor pressure of the substance influences the orientation of the crystals. The angle of incidence of the vapor during the process of sublimation varies the direction of crystal

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orientation. In the present paper the dependence of orientation on the PbS vapor pressure upon glass as the base layer is investigated. The very simple investigation method consists in turning the sample by 90° and determining the angle between the vertical and axial reflections. In this connection, three diagrams (Fig 1) and two electronic diffraction pictures (Fig 2) are shown. The main direction of crystal orientation is obtained. Further, the dependence of orientation on the direction of vapor-incidence and temperature is investigated, and the results obtained by means of electronographical methods are confirmed by pictures made with ordinary electronic microscopes (Figs 4,5). In the last part the connection between the surfaces of the two metallic types of photoresistors and crystal orientation is discussed, and finally the thermo-e.m.f. forming by heating the layers is investigated. There are 6 figures and 5 references, 2 of which are Soviet.

AUTHORS: Solov'yev, A. M., Vertsner, V. N. SOV/48-23-6-20/28

TITLE: The Use of the Electron Microscope EM-3 for Carrying out a Local X-ray Spectral Analysis (Primeneniye elektronnogo mikroskopa EM-3 dlya provedeniya lokal'nogo rentgeno-spektral'nogo analiza)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 6, pp 750-753 (USSR)

ABSTRACT: On the basis of papers by Castaing (Refs 1-3), Borovskiy and Il'in (Refs 4-7) used the electronograph EM-4 for the purpose of carrying out local X-ray spectral analyses. At the Gosudarstvennyy opticheskiy institut (State Optical Institute) a similar device was constructed by means of the electron microscope EM-3. It consists essentially of four parts: the electron-optical system, the X-ray spectrograph, the optical system for the investigation of the object, and the recording system. The device is shown by figure 1 and is discussed in detail. For the purpose of controlling the electron beam, a fluorescent crystal was used, which had been supplied by V. V. Kuprevich. The principle of the spectrograph is shown by figure 2, and its mode of operation is discussed. The instrument

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makes it possible to investigate the X-ray spectrum of the two phases of a binary solution. The results obtained by measurements carried out of Co, Ni, Cr, W and Mo with slight impurities are shown in a diagram (Fig 4). The results of these investigations show practicability of this unit. There are 4 figures and 8 references, 5 of which are Soviet.

AUTHORS: Malakhov, L. N., Vertsner, V. N., Lebedev, A. A. SOV/48-23-6-25/28

TITLE: The Use of Shadow-electronoptical Methods in the Investigation of p - n-Transitions in Germanium (Primeneniye tenevogo elektronnoopticheskogo metoda k issledovaniyu germaniyevykh p - n-perekhodov)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 6, pp 770-772 (USSR)

ABSTRACT: Vavilov was the first to use this method for investigations of semiconductors (Ref 2), and reference is made in the introduction to the results obtained by the investigation described in p 765 of this issue, where formula (1) was deduced for the displacement. Further, several data are given for the experimental unit: accelerating voltage 50 kv, 200 to 300-fold enlargement, and a resolving power of up to from 0.1 to 0.2 μ. The investigations were carried out on ground and polished germanium monocrystals, and a scheme of the experimental unit (Fig 1) is shown. The optical axis of the instrument touches the edge of a germanium crystal, the electrons in the crystal move in a direction that is

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perpendicular to the optical axis. From the displacement of the net located in the focal plane of the objective, conclusions are drawn as to the voltage distribution on the edge of the crystal, and as positive and negative voltages are applied to the electrodes of the crystal, "zero" of the voltage becomes visible (Fig 2). The dependence of the width of the p - n-transition of Ge on the applied voltage becomes clearly visible. The authors finally thank Academician A. A. Lebedev for his valuable advice and discussions. There are 2 figures and 4 references, 3 of which are Soviet.

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AUTHORS: Solov'yev, A. M., Vertsner, V. N.

TITLE: An Instrument for X-Ray Spectrum Microanalysis

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 4, pp. 362-366

TEXT: The present article is a reproduction of a lecture delivered at the 4th All-Union Conference on X-Ray Spectroscopy (Rostov-na-Donu, June 29 - July 6, 1959). In the introduction the authors describe the development and construction of an instrument for local X-ray microanalysis described in the following. A total view of this instrument, which was completed in 1959, is shown in Fig. 2 (photo); Fig. 1 gives a schematical representation. The instrument consists of four parts, i.e. the electron optical system, the electron probe, the X-ray spectrograph, and the optical system for the visual observation of the zone investigated. The electron optical system consists of an electron gun and a block of two electromagnetic lenses. The individual parts are described in detail. The X-ray spectrograph (shown in Figs. 2 and 3) is also

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An Instrument for X-Ray Spectrum Microanalysis

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described. It makes it possible to employ both the reflection- and the "penetration" method. It was constructed in a manner such that a vacuum spectrographic attachment could be applied (Fig. 4), which made it possible to analyze even light elements. The instrument itself is designed for the local detection of elements, from magnesium to uranium. Quartz plates of a radius of 500 mm served as analyzing crystal. They were arranged parallel to the $(1\bar{3}40)$ plane for the penetration method, parallel to the (0001) plane for the reflection method, and parallel to the mica (100) plane. Experiments were also made with LiF crystal (200). X-Radiation was recorded by Geiger counters. There are 4 figures and 8 references: 3 Soviet, 2 American, 1 British, and 1 Dutch.

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SPIVAK, G.V.; VERTSNER, V.N.; LUK'YANOVICH, V.M.; LEVIN, Ye.Ye.; SKAKOV, Yu.A.

Third All-Union Conference on Electron Microscopy. Radiotekh. i elektron. 6 no.5:852-862 My '61. (MIRA 14:4)
(Electron microscopy--Congresses)

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AUTHORS: Vertsner, V.N., Nikiforova, V.G., Bogdanovskiy, G.A., Kozelkin, V.V., Shchetnev, Yu.F.

TITLE: Optical-electron-microscope ЭМ-6 (EM-6)

PERIODICAL: Radiotekhnika i elektronika, v. 6, no. 8, 1961, 1365 - 1369

TEXT: This paper was presented at the 3rd All Union Conference on electron microscopy, Leningrad, October 1960. This is a description of an electron microscope as based on the proposal of V.N. Vertsner. It is a simple instrument, the resolution of which is half-way between that of an optical and an electron microscope, and which has been called the optical (light)-electron microscope. The production type is designated ЭМ-6 (EM-6). It incorporates an electromagnetic objective, which produces a magnified electron picture of the sample on a high-resolution monocrystallic screen, the picture being subsequently observed by an optical microscope

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of small magnification and photographed by a camera, type "Zenit C" (Zenit S). The source of electrons is the electron gun 1 (Fig. 2). The anode diaphragm is 1 mm in diameter and the cathode wire may be centered together with the modulating electrode, with respect to the anode. The focussing diaphragm 2 is directly behind the anode. The illumination system allows a narrow beam of electrons to reach the sample (about 100 μA) without additional lenses. The samples are introduced through the lock 3. The sample in a cylindrical holder is placed in the gap between the magnets, the holder being fixed at each end with rubber washers. The aperture diaphragm 4 is introduced into the gap behind the sample. The electron beam after passing through the sample reaches a second lens 5, whose magnification can be varied in three steps. The final electron image is formed at a monocrystalline screen 6; the side on which the beam impinges is covered by a thin layer of aluminum to prevent the charge built up. The screen is only 4 mm thick because of the properties of fluorite. The optical microscope 7 is fixed to the instrument by a hinge to facilitate access to the screen.

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D207/D304

Optical-electron-microscope ...

For photographs the best film is fluorographic film PÔ-3 (RF-3) but other films having sensitivity of 180-250 units of ГОСТ (GOST) e.g. type A-2, may be used. The exposure times vary from 2 to 25 sec, depending on the sample density and overall magnification, which at an optical magnification of 40 can be 10,000, 5,000 or 2,000. The adjustment of the instrument consists of directing the electrons along the optical axis of the objective by adjusting the tilt of the gun and the axial adjustment of the two diaphragms. The vacuum system consists of a distributor, a small rotary pump VH-494 (VN-494) and a diffusion pump HBO (NVO-40) with air cooling. The silicone oil and the diffusion pump is type BKЖ-94 (VKZh-94) and does not oxidize in air when heated. The power supply is from 220 V mains through a ferroresonant voltage stabilizer. HF, EHT supply is used. The HF oscillator utilizes a ГУ-50 (GU-50) tube, working at 60 Kc/s at an amplitude of 8-9 kV. This voltage is applied to a voltage multiplier where it reaches 35 kV. The optical electron microscope type EM-6 which is now being produced has a resolution of 150 Å for photography and 80-100 Å for visual obser-

Card 3/5

S/109/61/006/008/011/018
D207/D304

Optical-electron-microscope ...

vations. With very accurately manufactured magnet tips the resolution can be increased to 60 Å. It is stated in conclusion that the simple construction and easy use of the instrument will make it widely adopted, to obtain magnifications between those of the optical and of the pure electron microscope. There are 6 figures and 3 references: 2 Soviet-bloc and 1 non-Soviet-bloc.

SUBMITTED: February 7, 1961

Card 4/5

S/051/61/010/001/012/017
E201/E491

AUTHORS: Vertsner, V.N. and Vorob'yev, Yu.V.

TITLE: Field Chromatic Aberrations in an Electron Microscope

PERIODICAL: Optika i spektroskopiya, 1961, Vol.10, No.1, pp.120-126

TEXT: Morito (Ref.1) and Kanaya (Ref.2) were the first to study field chromatic aberrations (aberrations of magnification and rotation) in electron microscopes. These two workers used approximate representations of magnetic fields by bell-shaped curves, because the recent work on magnetic lenses was not yet available. Since some workers are of the opinion that such approximate representation may not be a faithful picture of experimental conditions, the present authors decided to calculate field chromatic aberrations anew, using the recent work on magnetic lenses. The calculations are reported together with experimental studies of the magnification and rotation aberrations in an electron microscope ЭМ-3 (EM-3). Gold-shadowed diffraction-grating replicas were used as objects and conditions for minimization of the magnification and rotation

S/051/61/010/001/012/017
E201/E491

Field Chromatic Aberrations in an Electron Microscope

aberrations were found. There are 7 figures and 3 non-Soviet references.

SUBMITTED: March 25, 1960

Card 2/2

VERTSNER, V.N.; VORONA, Yu.M.; VOROB'YEV, Yu.V.; BOGDANOVSKIY, G.A.; CHENTSOV, Yu.V.

Optics of EM-5 and EM-7 electron microscopes. Izv.AN SSSR.Ser.fiz. 25 no.6:680-682 Je '61. (MIRA 14:6)
(Electron microscope)

42198

S/051/62/013/004/019/023
E032/E514

AUTHORS: Vertsner, V.A., Vorona, Yu.M. and Zhdanov, G.S.

TITLE: Observation of the crystal lattice with the EM-5 (EM-5) electron microscope

PERIODICAL: Optika i spektroskopiya, v.13, no.4, 1962, 605-607

TEXT: It is noted that observations of crystal faces are usually carried out with complicated instruments with a resolution of 10 Å or better. Although the microscope EM-5 has a nominal resolution of 20 Å, its electron-optical parameters are such that it is possible, in fact, to obtain a resolution of the order of 10 Å. In view of this, the authors decided to use it to repeat the observations of Menter (Proc. Roy. Soc., A236, 119, 1956) and Bassett, Menter and Pashly (Proc. Roy. Soc., A246, 345, 1958; J. Phot. Sci., 7, 60, 1959). The condensing and intermediate lenses incorporated a fixed magnetic stigmator from the EM-7 microscope. The magnification was X5300 or X6700 at an accelerating voltage of 60 kV. A figure is reproduced showing the microphotograph of a copper phthalocyanin crystal in which the (001) planes, which are at a distance of 12.6 Å, are clearly resolved.

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The (201) planes, 9.8 Å apart, are also clearly resolved in another photograph. The fact that the EM-5 is capable of a 10-12Å resolution is therefore confirmed. There are 3 figures and 1 table.

SUBMITTED: May 16, 1962

9.4140

39166
S/120/62/000/003/034/048
E032/E114

AUTHORS: Chentsov, Yu.V., and Vertsner, V.N.

TITLE: A television method for enhancing the image brightness and contrast in an electron microscope

PERIODICAL: Pribory i tekhnika eksperimenta, no.3, 1962, 148-150

TEXT: The authors report a new method of enhancing the brightness and contrast by means of the direct excitation of the target of a transmitting television tube by the beam of fast electrons which produce the image in an electron microscope. M.E. Haine and P.A. Einstein are said to have carried out similar work in Britain (Proc. Europ. Reg. Conf. Electron Microscopy, Delft, 1, 1960, 97). The fast electrons produce a potential profile on a semiconducting screen (selenium, antimony sulphide and three-component compounds of these materials with arsenic) deposited on a polypropylene film on an aluminium backing. The fast image-producing electron beam of the ЭМ-5 (EM-5) electron microscope was used in conjunction with the commercial television apparatus ПТУ-О-М (PTU-O-M). Best results were obtained with a selenium target. The method has been found to produce a gain in

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A television method for enhancing... S/120/62/000/003/034/048
E032/E114

the magnification, brightness and contrast of the image at a lower current to the target.

IX.

ASSOCIATION: Gosudarstvennyy opticheskiy institut
(State Optical Institute)

SUBMITTED: July 22, 1961

Card 2/2

ACCESSION NR: AT4019289 S/0000/63/003/001/0081/0083

AUTHOR: Vertsner, V. N.; Vorona, Yu.M.; Zhdanov, G. S.

TITLE: Use of the EM-7 electron microscope for the investigation of crystal lattices and observation of dislocations

SOURCE: Simpozium po stekloobraznomu sostoyaniyu. Leningrad, 1962. Stekloobraznoye sostoyaniye, vy*p.1. Katalizirovannaya kristallizatsiya stekla (Vitreous state, no.1: Catalyzing crystallization of glass). Trudy* simpoziuma, v.3, no.1. Moscow, Izd-vo AN SSSR, 1963, 81-83 insert page between p. 80 and 81

TOPIC TAGS: glass, lattice structure, electron microscopy, dislocations, lattice dislocation, crystal lattice, copper phthalocyanin

ABSTRACT: The interlayer spacings were measured and dislocations were observed in copper phthalocyanin crystals by means of an EM-7 electron microscope in which the resolution was increased to 10 Å. Increasing the excitation of the objective to 4000 ampere-turns considerably decreased astigmatism, and spherical and chromatic aberrations. The electron microscope was used at 60 kV with a diaphragm 30-microns in diameter, at a beam current of 20 microamperes. Magnification

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ACCESSION NR: AT4019289

(electronic plus photographic) was 53,000 to 1,200,000 X, exposure time 8-10 sec. The conditions of the preparation and testing of the crystals are described. The small lattice spacings in one crystal with a period of 12.6 Å were resolved on 50% of the patterns, but spacings in crystals with a period of 10 Å were not visible under the electron microscope. Pictures of crystals or crystal sections with resolved faces are given in which each line corresponds to the projection on the photoplate of the crystal face (001) formed by copper phthalocyanin. Usually, the crystal faces were parallel to the edge of the crystal and had a perfect structure. However, dislocations were also observed in a crystal in which the planes converged at an angle of 15°. The microphotograph of a bent crystal is also illustrated. Orig. art. has: 4 figures.

ASSOCIATION: None

SUBMITTED: 17May63 DATE ACQ: 21Nov63 ENCL: 00

SUB CODE: MT, OP NO. REF SOV: 000 OTHER: 005

Card 2/2

ACCESSION NR: AT4019290 S/0000/63/003/001/0083/0084

AUTHOR: Vertaner, V. N.; Degteva, L. V.

TITLE: Electron microscopic investigation of the catalyzed crystallization of glass

SOURCE: Simpozium po stekloobraznomu sostoyaniyu. Leningrad, 1962. Steklobraznoye sostoyaniye, vy* p. 1: Katalizirovannaya kristallizatsiya stekla (Vitreous state, no. 1: Catalyzing crystallization of glass). Trudy* simpoziuma, v. 3, no. 1. Moscow, Izd-vo AN SSSR, 1963, 83-84, insert pages between p. 96 and 97

TOPIC TAGS: glass, crystallization, electron microscopy, glass 13, catalyzed crystallization, titanium glass, glass crystallization

ABSTRACT: The crystallization of glass 13 containing titanium (not exceeding 10%) as a catalyst was investigated. The initial glass, as well as transparent and opaque glasses obtained by different thermal treatments, were studied by the replica method. Carbon replicas shadowed with chromium or platinum-palladium alloy were used, but carbon replicas made with preliminary shadow casting were preferred. The different electron microscopic patterns obtained from the structure of the three types of glass were compared. The structure of the glasses during prolonged thermal treatment at a temperature

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ACCESSION NR: AT4019290

100 C lower than their crystallization temperature was studied. A structural change, as compared to the initial glass, was found only in a glass heated at 635 C for 300 hours. Finally, the variation of glass structure with the TiO_2 content was investigated. The glass structure changed only with additions of TiO_2 up to 11%. Glasses without titanium and with TiO_2 contents below 11% are structureless, but in glasses with a higher TiO_2 content, crystallization occurs. Orig. art. has: 6 figures.

ASSOCIATION: None

SUBMITTED: 17May63 DATE ACQ: 21Nov63 ENCL: 00

SUB CODE: MA NO REF SOV: 000 OTHER: 000

Card 2/2

VERTSNER, V.

"The world through the electron microscope." Reviewed by V. Vertsner. Opt. i spektr. 14 no.6:840 Je '63. (MIRA 16:8)

(No subject headings)

ALEKSEYEV, A. G.; VERTSNER, V. N.; ZHUKOVSKAYA, O. V.: PODUSHKO, Ye. V.; TIKHOMIROV, G.P.

"The structure of some glasses of LiO_2-Al_2O_3-SiO_2-TiO_2 system and its variation in thermal treatment over the wide temperature range."

report submitted for 4th All-Union Conf on Structure of Glass, Leningrad, 16-21 Mar 64.

VERTSNER, V.N.; CHENTSOV, Yu.V.

Mirror-type scanning electron microscope. Prib. i tekh. eksp. 8 no.5:180-182 S-O '63. (MIRA 16:12)

VERTSNER, V.N.; IVANOV, M.G.; VORONA, Yu.M.; NIKIFOROVA, V.G.; VOROB'YEV, Yu.V.; KLYUKIN, V.Ye.

EM-7 electron microscope. Izv. AN SSSR. Ser. fiz. 27 no.9:1193-1195 S '63. (MIRA 16:9)

(Electron microscope)

CHENTSOV, Yu.V.; VERTSNER, V.N.

Television method for increasing brightness and contrast in an electron microscope. Izv. AN SSSR. Ser. fiz. 27 no.9:1207-1209 S '63. (MIRA 16:9)

(Electron microscopy)

VERTSNER, V.N.; TIKHOMIROV, G.P.; DAVYDOV, M.S.

Electron-microscopic and electron diffraction studies of photosensitive lead sulfide films obtained by precipitation from solutions. Izv. AN SSSR. Ser. fiz. 27 no.9:1228-1231 S '63. (MIRA 16:9)

(Electron microscopy) (Electron diffraction examination)
(Lead sulfide—Testing)

ALEKSEYEV, A.G.; VARGIN, V.V.; VERTSNER, V.N.; KIND, N.Ye.; KONDRAT'YEV, Yu.N.; PODUSHKO, Ye.V.; SEREBRYAKOVA, M.V.; TIKHOMIROV, G.P.; TUDOROVSKAYA, N.A.; FLORINSKAYA, V.A.; LIBERMAN, N.R., red.

[Controlled catalyzed crystallization of glasses of the lithium aluminosilicate system] Kataliziravannaia reguliruemaia kristallizatsiia stekol litievoaliumosilikatnoi sistemy. Leningrad, Khimiia. Pt.1. 1964. 119 p. (MIRA 18:4)

ACCESSION NR: AP4010759 S/0020/64/154/001/0178/0180

AUTHORS: Alekseyev, A. G.; Vertsner, V. N.; Kondrat'yev, Yu. N.; Podushko, Ye. V.; Tikhomirov, G. P.

TITLE: Investigation of catalyzed crystallization of glass

SOURCE: AN SSSR. Doklady*, v. 154, no. 1, 1964, 178-180

TOPIC TAGS: glass crystallization, catalyzed crystallization, glass opacity, spodumene, glass thermal treatment, Li_2O-Al_2O_3-SiO_2 Glass, TiO_2 catalyst

ABSTRACT: Glasses of the systems Li_2O-Al_2O_3-SiO_2 (similar in composition to that of spodumene) with 5% addition of TiO_2 as a catalyst were studied. Structural analysis was performed by electron- and X-ray diffraction. In addition, changes in light absorption were measured. Specimens were heat treated in air for 25 hrs in the temperature range between 600 and 1000°. There was no noticeable structural change in glass up to 625°. In the range from 625 to 700°, small crystals in some parts of the specimens appear. Above 700°, small-crystalline phase in the whole volume

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ACCESSION NR: AP4010759

is formed. The crystals remain small up to 830°. Above this temperature large size crystals are formed, and the glass becomes opaque. Orig. art. has: 3 Figures.

ASSOCIATION: None

SUBMITTED: 06Jun63	DATE ACQ: 10Feb64	ENCL: 00
SUB CODE: CH	NR REF SOV: 001	OTHER: 002

Card 2/2

469-65 AFTC(b)/SSD/ASD(-)-5/AS(mp)-2/AFWL/ESD(gs)/ESD(t)/RAEM(t)

ACCESSION NR AP5024[illegible] S/0109/64/000/008/1488/1493

AUTHOR: Vertsner, V. N.; Vorona, Yu. M.

TITLE: Resolution and dispersion of the EM-5 and EM-7 electron microscopes during electron diffraction studies

SOURCE: Radiotekhnika i elektronika [illegible] 1964, 1488-1493

TOPIC TAGS: electron microscope, diffraction analysis, microdiffraction, macrodiffraction, intermediate lens, electron diffraction/EM-5 microscope, EM-7 microscope

Abstract: The article considers the operation of the EM-5 and EM-7 micro-

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L 8469-65

ACCESSION NR: AP4048490

ASSOCIATION: none

SUBMITTED: 08Jun63 ENCL: 00 SUB CODE: EC, OP

NO REF SOV: 001 OTHER: 000 JPRS

VORONA, Yu.M.; ZHDANOV, G.S.; VERTSNER, V.N.

Characteristics of studying crystal lattices with the EM-5 electron microscope. Zav.lab. 30 no.12:1480-1482 '64.

(MIRA 18:1)

L 2374-66

ACCESSION NR: AP5020826 UR/0020/65/163/004/0865/0867

AUTHORS: Zhdanov, Gl. S.; Vertsner, V. N.

TITLE: The use of zeolites for decreasing hydrocarbon accumulation in electron microscopes

SOURCE: AN SSSR. Doklady, v. 163, no. 4, 1965, 865-867

TOPIC TAGS: zeolite, electron microscope, hydrocarbon, contamination

ABSTRACT: Present measures for prevention of contamination in electron microscopes are deficient chiefly because of the difficulty of introducing the cooled protective diaphragm into such a narrow space—the restricted zone of the upper pole piece of the objective lens. The authors suggest a method of decreasing the partial hydrocarbon pressure in the electron microscope by means of zeolites. The zeolites were chosen because of their great adsorbent properties at low pressures, their high mechanical strength, and the simplicity of their regeneration. Zeolite granules were introduced directly into the tube of the instrument or in a glass extension attached to the tube. Even without cooling, this arrangement proved very effective. Zeolite granules with pore spaces of 10 Å and specific surface of 1000 m^2/g were used. The rate of hydrocarbon accumulation was observed at a

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L 2374-66

ACCESSION NR: AP5020826

current density of 0.2-0.5 amp/cm^2 and a beam density of 3-4 μ. The initial rate of growth was 2 Å/sec. Several days after adding the attachment with zeolites, the rate had declined to 0.25-0.2 Å/sec. Introduction of zeolite in a ring directly around the specimen caused the rate of growth to decline to 0.08-0.04 Å/sec. When the beam was especially intense, the organic film could be removed entirely. It was found that zeolites give practically the same results as a cooled chamber, and the technique eliminates the existing difficulties of manipulation as well as the necessity of using liquid nitrogen. Zeolites may also be used for devices other than the electron microscope when such problems of contamination are encountered. "The authors express their thanks to S. P. Zhdanov for fruitful consultations during the work." Orig. art. has: 3 figures.

ASSOCIATION: none

SUBMITTED: 25Dec64 ENCL: 00 SUB CODE: OP, EC

NO REF SOV: 001 OTHER: 006

BVK

Card 2/2

11869-66 EWT(m)/EWP(e)/EWP(b) GS/WH

ACC NR: AT6000503 SOURCE CODE: UR/0000/65/000/000/0351/0356

AUTHOR: Alekseyev, A. G.; Vertsner, V. N.; Zhukovskaya, O. V.; Podushilo, Ye. V.; Tikhomirov, G. P.

ORG: None

TITLE: The changes in the properties and structure of Li_2O-Al_2O_3-SiO_2-TiO_2 glasses during heat treatment in a wide range of temperatures

SOURCE: Vsesoyuznoye soveshchaniye po stekloobraznomu sostoyaniyu. 4th, Leningrad, 1964. Stekloobraznoye sostoyaniye (Vitreous state); trudy soveshchaniya, Leningrad, Izd-vo Nauka, 1965, 351-356

TOPIC TAGS: lithium glass, silicate glass, aluminum silicate, solid solution, catalized crystallization, crystal

ABSTRACT: The properties and structure of lithia-aluminosilica glasses catalyzed by TiO_2 and treated within a wide range of temperatures have been investigated. Special attention was paid to glasses the composition of which was close to spodumene (SiO_2 - 60.5; Al_2O_3 - 28.0; Li_2O - 6.5; TiO_2 - 5.0 weight %). The results cover the dependence of the index of refraction and glass density on the duration of treatment, the comparative x-ray and infrared reflection spectra for glasses treated at different temperatures, and the dependence of the index of refraction and glass density on treatment temperature. Curves of the differential thermal analysis are also given. The results show that at temperatures of 700 to 800C the resulting crystals

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L 11869-66

ACC NR: AT6000503

belong basically to the eucryptite-like solid solution. By their chemical composition these crystals are close to spodumene. At 890C, the basic crystalline phase becomes apparently identical to the β modification of spodumene, and the solid solution is now of the spodumene type. Orig. art. has: 6 figures.

SUB CODE: 11, 20 / SUBM DATE: 22May65 / OTH REF: 002

Card 2/

L 15254-66 EWT(1) LJP(c)
ACC NR: AP5027835 SOURCE CODE: UR/0020/65/165/001/0061/0062

AUTHOR: Vorona, Yu. M.; Vertsner, V.N.

43
B

ORG: none

TITLE: Use of double focusing electromagnetic lenses for microelectron diffraction pattern projection

21, 44, 55

SOURCE: AN SSSR. Doklady, v. 165, no. 1, 1965, 61-62, and insert facing p. 62

TOPIC TAGS: electron diffraction analysis, electron optics, electron lens, electron microscopy

ABSTRACT: Conventional methods of electron microscopy utilize intermediate lens for the projection of enlarged images of the object or of its diffraction pattern. However, the authors show that a more detailed analysis of the properties of the condenser--objective lens makes the projection of enlarged electron diffractions possible without the introduction of an intermediate lens. Usually, the objective lens of an electron microscope forms, near the second focal point, a reduced image of the source of electrons. By increasing the excitation of the lens, this image plane moves toward the center of the lens and at a certain point

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L 15254-66
ACC NR: AP5027835

double focusing of the electron beam is achieved by the single objective lens. The first section of the lens's field produces a reduced image of the cathode at a spot which is near the maximum of the field, and the second section of the field carries out the magnification. If an object is placed above the plane of the first image of the electron source, the plane then contains the desired diffraction pattern which is then magnified by the second part of the field of the objective lens. The article discusses questions of resolution and magnification of the newly proposed approach, and describes the favorable results obtained on a test setup designed in a standard EM-5 electron microscope. The paper was presented by Academician A. A. Lebedev, 22 Mar 65. Orig. art. has: 3 figures.

SUB CODE: 20 / SUBM DATE: 05Mar65 / ORIG REF: 001 / OTH REF: 002

Card 2/2

L 25777-66 EWT(1)
ACC NR: AP6016368 SOURCE CODE: UR/0070/65/010/005/0715/0722

63
B

AUTHOR: Vertsner, V. N.; Zhdanov, G. S.

ORG: State Optical Institute (Gosudarstvennyy opticheskiy institut)

TITLE: Electron microscopic study of the low-temperature varieties of ice

SOURCE: Kristallografiya, v. 10, no. 5, 1965, 715-722

TOPIC TAGS: electron microscopy, crystallography, ice, cryogenics, freezing

ABSTRACT: Varieties of ice forming in a vacuum on cooled substrates owing to the condensation of residual water vapors were investigated. The formation of the hexagonal, cubic, and amorphous varieties was observed in the temperature range of -90 to -160°C. The amorphous form changed to cubic on heating to a temperature above -140°C. No transition of the cubic form to the hexagonal was observed, since at -70 to -80°C the thin films of ice rapidly evaporated. The role of organic impurities in the variation in temperature of the formation and sublimation of ice is examined. The dependence of the nature of crystal formation on the substrate temperature, cooling rate, and water-vapor pressure is traced. The dimensions of the crystals forming on the substrate decreased with decreasing temperature of the object and increasing rate of cooling. It is concluded that the findings of this investigation may be utilized in selecting a rational regime of the cooling of biological objects. As the substrate temperature gradually decreases,

UDC: 621.385.833:549.511.1

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L 25777-66
ACC NR: AP6016368

the hexagonal form of ice appears and changes over first, to the cubic and then, to the amorphous form. The temperature range of formation of the hexagonal modification is the broader the higher the water-vapor pressure above the object is. Cubic ice is obtained without any traces of hexagonal ice only in the presence of a vacuum on the order of $1 \cdot 10^{-5}$ mm Hg and a temperature below -130°C. The amorphous form of ice arises at a temperature below -150°C. As the temperature rises, the thin films of amorphous ice completely change to the cubic form. A decrease in substrate temperatures is accompanied by a decrease in the dimensions of the crystals forming on the substrate and by an increase in the tendency of preferential growth in the plane of the substrate. The presence of free hydrogen bonds at the crystal surfaces causes a tendency of the crystals to intergrow mutually and form long polycrystalline chains. This process is particularly marked on heating. Organic impurities may play a major role, even with careful shielding of the object, resulting in a lower formation point and a higher evaporation point of ice. The investigation of ice by means of microanalytic techniques leads to a better understanding of the nature of the processes that occur during the freezing of different water-containing objects, primarily biological, and is a means of selecting optimal conditions for the freezing, storage, and thawing of preparations. Orig. art. has: 5 figures and 1 table. [JPRS]

SUB CODE: 20 / SUBM DATE: 02Aug64 / ORIG REF: 001 / OTH REF: 010

Card 2/2 CC

L 04493-67 EWT(1)/EWT(m)/T/EWP(t)/ETI IJP(c) RDW/JD/GG

ACC NR: AP6015770 (A,N) SOURCE CODE: UR/0048/66/030/005/0799/0802

AUTHOR: Biller,L.N.; Vertsner,V.N.; Davydov,M.S.; Kosnyrev,V.S.; Tikhomirov,G.P.

ORG: none

TITLE: Electron diffraction and electron microscope investigation of the initial stages of formation of lead sulfide and lead selenide films /Report, Fifth All-Union Conference on Electron Microscopy held in Sumy 6-8 July 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 5, 1966, 799-802

TOPIC TAGS: electron microscope, electron diffraction, lead compound, sulfide, selenide, photoconducting film

ABSTRACT: The growth of thin films of lead sulfide and lead selenide deposited from solution onto glass or sapphire substrates has been investigated with an electron microscope, using the carbon-platinum replica technique, and by electron diffraction. The investigation was undertaken because of the technical importance of the materials for the production of photoconductive cells. The initial reagents were lead acetate, thiourea or selenourea, and sodium or potassium hydroxide. The size and distribution of crystals in the films were determined with the electron microscope, and the presence of impurities was detected by electron diffraction, using a transmission technique for the thinnest films and a reflection technique for the thicker ones. It was found that a necessary condition for the formation of a film that would adhere well to

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L 04493-67
ACC NR: AP6015770

the substrate was the simultaneous deposition with the lead sulfide or selenide of some other poorly soluble lead compound (lead cyanamide, oxide, or subcarbonate). The lead selenide and sulfide crystals formed in the solution adhered poorly to the substrate, and the deposition of impurities inhibited the growth of these crystals and reduced the rate of increase of the thickness of the film. The formation of the impurity phases took place mainly in the early stages of the deposition when the solution was still rich in lead ions, for the impurities are considerably more soluble than the sulfide or selenide. It was sometimes difficult to detect the presence of an impurity phase in the lead sulfide or selenide films, particularly in the case of lead oxide which under some conditions was amorphous. The impurity could be detected, however, by treating the film with a solution capable either of dissolving the impurity or of converting it to lead sulfide (or selenide). Vacuum deposited films containing no impurities were unaffected by this treatment, whereas films deposited from solution were usually destroyed as a result of detachment from the substrate. Orig art has: 4 figures.

SUB CODE: 20/ SUBM DATE: 00/ ORIG REF: 001/ OTH REF: 002

Card 2/2 ejk

ACC NR: AP6015757 SOURCE CODE: UR/0048/66/030/005/0754/0757

AUTHOR: Vertsner,V.N.; Gerling,V.E.; Zenov,B.K.; Krupchatkin,V.D.; Omelin,V.M.; Solov'yev,A.M.; Toporkov,S.A.; Ustimenko,V.V.

ORG: none

TITLE: An x-ray microanalyzer featuring recording without a crystal /Report, Fifth All-Union Conference on Electron Microscopy held in Sumy 6-8 July 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 5, 1966, 754-757

TOPIC TAGS: x ray analysis, proportional counter, special purpose computer

ABSTRACT: An x-ray microanalyzer is described in which the x rays are recorded directly with a proportional counter without the use of a crystal diffraction x-ray spectrometer. This type of recording has the advantages of simplicity and high sensitivity, and the disadvantage of low resolving power. The electron-optical system of the instrument provides a 3-5 μ diameter probe with a current of about 1 μA. Adjustment is facilitated by an optical microscope with a resolution of 3μ and a working distance of 19 mm, which can be focused by means of a lever without breaking the vacuum. Type CPM-1 sealed off proportional counters as well as flow-type counters have been employed with this instrument. These counters with their associated circuits cannot resolve the K lines of neighboring elements. When the concentrations of neighboring elements

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L 36551-66
ACC NR: AP6015757

is to be determined, the counting rate versus pulse height curve is resolved mathematically into three curves, each representing the contribution of one of three neighboring elements. This resolution is effected automatically by a computing circuit, the operating principle of which is described and is based on a modification of the technique proposed by R.M.Dolby (Proc. Phys. Soc., 73 81 (1959)). The error in determining concentrations of neighboring elements is about 20 %; this large error is due to the long time required for the determination (at least 40 minutes) together with the instability of the proportional counter, the amplifier, and the differential discriminators. When the elements to be determined differ in atomic number by more than 4 or 5 units the different K lines are directly resolved and the error of the determination is not more than 5 %. Under these conditions the computing circuit can be used as a three-channel pulse analyzer for the simultaneous recording of the K line intensities of three different elements. Orig. art. has: 3 formulas and 5 figures.

SUB CODE: 20/ SUBM DATE: 00/ ORIG REF: 000/ OTH REF: 005

Card 2/2 MLP